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THE ECONOMIC GEOGRAPHY OF CHILE.

BY

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General Description.

Chile is a country of geographic extremes. The long, narrow strip between the Andes and the ocean, extending from 18° S. to Cape Horn, is half as long again as is the United States from north to south, and, excepting Brazil, covers more degrees of latitude than any country in the world. No country equals Chile in the range of her climate. In the north is the desert, one of the most absolute upon the globe, and with the full rigour of the tropic sun. In the south are drenching rains and the glaciers, snows, and mists of the cold temperate or well-nigh sub-arctic region of Magellan Straits and Cape Horn. In elevation the same extremes are found. In some parts the coasts are towering cliffs and on the not far distant eastern boundary are the steep and almost unscalable Andes, whose summit at Aconcagua was until recently the highest point reached by man. The snow-capped peaks of this remarkable mountain system "can be seen from almost any point within the territory." *

Chile's nearest geographic and climatic counterpart is to be found upon the Pacific Coast of North America. If Chile were inverted and brought alongside of the North Pacific coast, the similarity would indeed be striking, for in addition to the general resemblances that come from latitude, glaciation, ocean currents, and winds, the topography of the two regions happens to have in com-

* From a report by the United States Consul-General at Santiago in Commercial Relations of United States, 1901, Vol. II., p. 649.

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mon a low coast range and a high sierra enclosing a fertile valley in a latitude most favourable for the development of agriculture. The inverted Chile would face the coast of North America from a point on the Mexican coast opposite the City of Mexico to Southern Alaska in the vicinity of Sitka. These rather surprising dimensions are possible because North America, being almost entirely in the temperate zone, measures its length chiefly between the Polar regions and the tropics and does not approach the equator, while South America stretches across most of the temperate zone and the torrid to the equator and nearly a thousand miles beyond it.

The chief element of climatic difference between the corresponding latitudes of Pacific North and South America is in the ocean current that bathes their shores and from which blow the prevailing winds which dominate their climate. The North American current has its origin in the warm Japanese current that is only partially cooled and slightly mixed with Arctic waters in passing Kamchatka and Alaska. The Chilean current has an unobstructed sweep from the ice-clad shore of the Antarctic continent, and its cooling effects extend even beyond the equator, giving the South American coast a cooler climate than corresponding northern latitudes. The southern coast of Chile, like that of British Columbia and Alaska, has been chiselled out by glaciers until the coast range is reduced to a succession of bold rocky islands and the interior valley is a succession of sounds. In the North Temperate Zone Vancouver Island and Puget Sound mark the end of this formation in latitude 48° N. In Chile the sounds extend to latitude 42° S. where the Gulf of Corcovado separates the Island of Chiloe from the mainland. In both continents the fiord districts are visited by heavy rains and clothed with dense forests. Thence the rainfall declines as we progress equatorwards until on the margin of the trade-wind zone agriculture is only possible by irrigation and, finally, the supply of water for this purpose failing, the region of desert is reached. From Puget Sound to San Diego, the southernmost outpost of California agriculture, is 15⅓ degrees, but owing to the climatic difference above referred to, the corresponding region in Chile from Huasco to Port Montt is about two degrees less.

In the North and South Temperate Zones these central belts, bounded on one extreme by the aridity of the region of the trade winds and on the other by the cold and rugged forests, are the zones of agriculture, the centres of population and power. On each side are the less hospitable zones that can only be useful in

the more secondary way, resulting from the purely extractive industries of the moist forests or the deserts with their minerals. Although the Chilean desert is one of marvellous riches and is now a scene of busy industry, it cannot become a permanent abiding place for man unless some entirely unforeseen climatic changes occur. The southern forests may become the home of considerable settlements of a permanent character, depending for their livelihood chiefly upon forest products, but the economic centre of gravity and the home of four-fifths or more of Chilean population is, and must continue to be, in the central or agricultural region.

Before going into a fuller description of Chile's natural wealth and industries, it is well to give some attention to the resources that lie in her people.

II. Characteristics and Social Condition of People as Affecting Industry.

Economic geography cannot stop with a mere enumeration of physical resources. There may be conditions present that bar the way to their utilization, and resources are resources only in the light of their prospective or possible conversion into utilities available for human consumption. Natural resources and man must both be considered. For example, the Amazon Valley possesses a fertility of soil probably unrivalled on the surface of the earth, but the heat, the rainfall, the forest, the floods, and the consequent diseases and discomforts make it uninhabitable except to a few sickly rubber gatherers, and the utilization of the region on a large scale as a home for civilized communities of progressive race cannot now be foreseen.

Chile has the great advantage that, with all the extremes, the climate is everywhere healthful, and the country possesses the climatic possibility so rare in Spanish America of becoming a white man's land, and fully entering into Western civilization, stability, and industry. The people style themselves the Yankees of South America. Racially, Chile will be a white man's land in a modified sense only. One-third of the population, and the dominant third, is of pure Spanish race. The remaining two-thirds are of mixed Spanish and Indian, with a small remnant of pure Indian (Araucanian) in the South. In the racial elements there present Chile is far ahead of any other Spanish-American country bordering on the Pacific. In most of these countries the population is almost entirely native, some writers putting the white population of Nica-

ragua, for example, at 1,200. Honduras has but a few thousand, and the proportions are virtually the same in Ecuador and Peru. The Chilean half-breeds and working classes, though good workers when sober, are reported as ignorant and much given to drink, and the mortality among them is very high.*

The Spanish people in Chile are the Basques from the northern part of Spain, and the best workers in the Peninsula. The Chilean natives—the Araucanians—are, for native Americans, superior stock. They drove the early Spanish settlers out of southern Chile a century after the settlements were founded, and maintained themselves in semi-civilized independence until late in the 19th century, when they were again brought under white rule and their lands thrown open to settlers, some of whom have been Germans.

Proof of Chile's superiority among Spanish-American countries upon the Pacific is seen in her peaceful history and in her substantial industries. While most of the other so-called republics have, since their independence from Spain, been convulsed by the strife of mediaeval knights-errant and reduced to chaos and anarchy, Chile has had comparative peace,† unbroken except by one short and sharp civil war and one foreign war of remarkably successful conquest.‡

The economic advantages of race, climate, and natural resources are partly offset by the social conditions of the country. Although free from war, Chile is an aristocracy where well-nigh feudal conditions prevail. The property of the country is in the hands of a few. Agricultural estates are often of enormous extent, a thousand-acre farm being considered small, and 10,000 and 20,000-acre tracts not uncommon. When public lands upon the frontier are sold the tracts are large, 1,500 to 5,000 acres, and the same individual can arrange to secure as many tracts as he wishes. The owners of these great estates live like princes. Absenteeism is common, and the unlettered and shiftless labourers are in a state

* Bad sanitation is everywhere, and the death-rate of Valparaiso and Santiago is 70 per 1,000, more than three times as great as in corresponding European and American citles. W. A. Smith, *Temperate Chile*, p. 37.

† Chile has not had wars, but neither has she had security for the individual. The enforcement of law is lax and violence is common. One British observer declares that 3,000,000 Chileans commit more acts of violence annually than the 85,000,000 in the United States. W. A. Smith, in *Temperate Chile*.

‡ The valuable nitrate fields of Chile were wrested from Peru and Bolivia as a result of the war of 1879–84.

Strained relations with Argentine over the boundary dispute, 1896–1902, led to war preparations that were a considerable embarrassment to industry.

of semi-serfdom because of continuing indebtedness. These great estates hamper the development of industries, especially agriculture (an experience that California has shared). Much of the Chilean land is unused and held for speculative purposes by the very powerful Church and by the wealthy aristocracy, the Church waiting for others to make it valuable, and the aristocracy striving to live by political means in the cities. A decade ago the rich and undeveloped country was, because many were unemployed and wages for the worker were low, in a serious industrial condition, with great social discontent. The landless population had gathered in cities to an extent almost unprecedented in such a country,* and relief has been sought in the establishment of a protective tariff, which is very popular and is leading to a considerable industrial development, accompanied by a surprising decline in the export of wheat.

Two methods may be followed in presenting a view of the industrial life of a country. One of these is the description of industries one after another for the whole country, and the other is the discussion of the resources and activities of the different sections of the country. The first of these methods is better for a country that is within itself free from sharp geographic contrasts, and the second is better for a country that has distinctly marked natural divisions. There is no country in the world that lends itself to the second method better than Chile, if indeed as well. The long strip of plain and plateau between the ocean and the Andes, extending from the hot sands of the tropic desert to the vanguard glaciers of the Antarctic, measures off one geographic unit after another with a precision rarely found and easy to classify. The evenness of the oceanic climate adds to the precision of the distinctions.

For the purposes of this paper Chile is best divided into three regions: I. The Northern Deserts; II. The Central Agricultural Region; III. Patagonian Chile.

III. The Northern Deserts.

The northern third of Chile is remarkable among deserts, because it possesses great mineral riches and furnishes five-sixths of the national revenue. Aridity is usually a curse upon any land, but

*See *Engineering Journal*, Vol. 8, p. 29. The Census of 1895 reported an urban population of 1,240,353 and a rural population of 1,471,792, and this in a country with almost no industries.

the aridity of the Chilean desert is the source of its greatest wealth, and if the climate of this district should suddenly change to one of moderate rainfall, the value of the desert would melt away, great industries would be destroyed, national finances wrecked, and an economic crisis brought about. Here in an absolute desert, without traces of animal or vegetable life, is practically the world's supply of nitrate of soda, an important chemical and the strongest-known agent for the promotion of plant life.

For more than 500 miles the upper earth is charged and the surface often covered with incrustations of salts left by the evaporation (apparently) of sea water. These salts are chiefly lime, soda, magnesia, alumina and boracic acid, and the important deposits of soda (nitrate) occur to the east of the coast-line of hills,* at an elevation of 3,000 to 4,000 feet and a distance of from 15 to 90 miles from the ocean, but some of the deposits of other salts, especially borax, are at much greater distances inland, extending even into Bolivia and the northwestern province of the Argentine.

The exact nature of the origin of these deposits is still in doubt. Recent geologic changes are evidenced by the remains of 12 successive beach marks in 2,500 feet elevation on the hills back of the port of Mejillones. The amount of salts remaining is much too great for a simple impounding of an arm of the sea. But it is suggested that a tide may, at frequent intervals, have re-filled it, and that great accumulations of seaweed furnished the nitric acid necessary to convert the sodium into nitrate of soda. The presence of iodine (a component of seaweed) helps bear out this theory, as does the presence of fragments of undecayed seaweed. The location of the richest deposits on the sides of hills is further evidence of beach deposits.†

The nitrate is found in a narrow strip from 1 to 4 miles wide and extending, with occasional breaks, for about 300 miles‡ north and south on the east side of the coast range. The actual deposits cover about 220,000 acres. This mineral is by far the most valuable natural resource, and gives rise to Chile's chief export and leading industry. The location of these deposits at great distances from any base of supplies has made their utilization difficult and costly, and has always made it necessary to support communities under very artificial conditions. For nearly 900 miles there is no agricul-

* Bulletin of Bureau of American Republics, Vol. II., p. 229.

† For a discussion of theories to explain this wonderful deposit, see Blackwood's Magazine, Vol. 161, p. 431.

‡ Carpenter, F. G., *South America.*

ture possible along the coast; for 400 miles there is not even a stream coming down from the Andes, and in the early days of the nitrate industry the nitrate ports were dependent upon commerce for water, as well as every other article consumed by man or beast. Ships proceeded along the coast, distributing water as they went, and getting a fresh cargo at each end of the route. In 1835 the price at Iquique was 4 shillings 6 pence for 18 gallons; but this industry is now in the main superseded, although steam condensers are common, and water is still bought and sold in some of the smaller places. The recent rapid increase in nitrate consumption has increased the population of the desert ports and put them on so firm a basis that they have laid pipe lines to the Andes. That supplying Iquique is 80 miles long, and Antofagasta draws its water supply 180 miles, probably the greatest distance of any city in the world.*

The life of Iquique is typical of the nitrate ports. Here is a city of 42,000 people located on a sand beach hundreds of miles from supplies, but having street railways, a system of sewers, an ocean cable, telegraph, telephone, electric light, theatres and libraries, newspapers and clubs. Back of the town rises a rocky cliff 2,000 feet in height, up which zigzags the nitrate railway which goes some 40 miles inland to the plain ("Pampa") of Tamarugal, the scene of the greatest nitrate works. This railway is a standard gauge line 300 miles in length, extending to the port of Pisagua on the north and to Lagunas on the south. Other roads connect this plain with the ports of Agua Santa and Junin.

The nitrate industry itself, like the towns along the coast, has been transformed by its prosperity. It is prosecuted by both native and foreign capital, but especially British,† and the companies operate on an extensive scale. The plants are enormous structures, and railway connection is often secured by the building of private lines. One company owns 18½ square miles of land and 70 miles of railway,‡ the road itself costing £650,000. These companies must also build towns in the desert for their hundreds of workmen, and some of them in addition to owning a factory, a mining town and railway, also own a port on the Pacific. The scale and method of operation are illustrated by the experience of a company that made an improvement reducing the cost of production one cent. per hundred pounds of nitrate. The net gain to the

* Carpenter, *South America*, p. 195.

† More than $100,000,000 (American gold) of British capital are said to be invested in this industry alone.

‡ Bulletin of B. A. R., Vol. II., p. 231.

company was $1,200 per month, or 6 per cent. per annum on $240,000.

Darwin described the nitrate deposits by saying that they looked like "a country after snow before the last dirty patches are thawed." The first layer is a thin coating of dust or friable sand and gypsum. The second layer is rocky conglomerate, usually hard, and ranging in thickness from a few inches up to 30 feet. It contains from 10 to 20 per cent. of nitrate, but is cast aside for the third layer, the "caliche," which is softer, sometimes cheesy. In the pampa of Tamarugal this layer ranges from a few inches in thickness to seven and rarely to ten feet, and contains from 30 to 50 and occasionally 80 per per cent, of nitrate. It is obtained by blasting away the three layers and the caliche is then separated with pick and shovel and carted or taken by rail to the reducing plants. Here it is crushed in rollers, dissolved in water, and boiled down in great open vats. When it is reduced to the proper point cooling produces crystallization, the product resembling coarse salt in appearance. Salt is also one of the by-products and iodine is derived from the mother liquor.

The production for five years has been as follows:

	TONS.
1897	1,064,075
1898	1,254,000
1899	1,360,000
1900	1,490,000
1901	1,263,000

As this region has a practical monopoly of the world's nitrate trade, it was a comparatively simple matter for the producers to form a combination for the control of output and prices. In 1901 the industry was not considered sufficiently profitable, and the nitrate association ordered a 10% reduction in output and a 25% increase in price. The agreement has been maintained, to the great increase of dividends in the constituent companies. The same organization conducts an organized propaganda in Europe and America to increase the consumption of nitrate by spreading knowledge of the uses to which it may be put.

The Chilean Government also takes advantage of the fact that its nitrate is a monopoly. The foreigner who exploits the fields complains that the Government exploits him. Certain it is that five-sixths of the Chilean Government revenues are derived from the export duty that is levied on nitrate of soda and its by-product, iodine.

The question of the continuance of the supply of nitrate is an important one owing to the increasing dependence upon it of both chemical manufacture and agriculture. The cessation of the supply would lead to serious inconvenience to many industries and might embarrass the world's food supply.*

The Chilean Government engineers estimate the available nitrate at about 220 million tons, a supply sufficient for many decades even at the present rate of increase in consumption. A higher price would make possible the reduction of the low grade and harder nitrate rock that is now thrown aside.

The Chilean desert also produces a large part of the world's borax, the supply appearing to be unlimited and the output coming from several localities. Owing to the purer but more scattered deposits and smaller scale of these operations, much of this mineral is carried a considerable distance on mules or in wagons.†

Another desert product of the northern coasts is guano, the droppings of sea birds which have remained for ages undisturbed and untouched upon the rocks where the birds congregate. This industry is now in its last feeble stages. Its prosecution was too simple and easy to endure. The deposits of Chile never rivalled those of Peru, and both are now nearly exhausted and the export has sunk to a comparatively small figure ‡ and is likely to disappear, as Chilean agricultural operations will probably demand the small annual output. This industry passed its prime a quarter of a century ago and has been succeeded by the nitrate iudustry.

In addition to the products due directly or indirectly to its aridity, the desert region is rich in copper, gold, silver, iron, and manganese ore. The silver, gold, copper, and manganese are mined, despite difficulties imposed by the climate. Many of the mines are so situated that the ores and water for the miners are taken considerable distances in carts or on the backs of mules, and only ores of high grade can be used. A few thousand tons of iron ore are taken annually from the port of Coquimbo to Antofagasta for use as fluxes in the smelters there, but none is mined for the smelting of iron. A considerable part of the silver and silver ore exported from Chile is the product of Bolivia, brought to the seacoast for shipment by the Antofagasta Railway. In copper production Chile ranks

* Agriculture is finding some relief in the discovery that the leguminous plants have the power of securing free nitrogen from the air and storing it in the earth about their roots. Chemical science is striving, and not hopelessly, for an economical method of crystallizing and "fixing" the free nitrogen of the air.

† Commercial Relations of the United States, 1902, Vol. I, p. 746.

‡ 34,434 tons in 1900.

third,* being exceeded by the United States and Spain. A considerable part of the product comes from the central part of the country, where it is smelted in crude furnaces by farmers and cattle raisers, who mine it when not pursuing their regular vocations.†

IV. The Central Agricultural Region.

As in California, so in Chile the transition from the desert to the agricultural region is gradual. As Santiago is approached going southward there are heavy winter rains and the valleys furthermore are watered to a greater or less extent by the mountain streams from the Andes, making irrigation possible. At Huasco, in latitude 28° S., is the first of these irrigated valleys producing oranges, raisins, wine, alfalfa, and the general agricultural crops. Thence southward to Santiago a succession of these fertile valleys is green with irrigated farms devoted to fruits, the necessary garden crops, and wheat, barley, rye, oats, and forage plants. The proportion of land that is supplied with water for irrigation in the upper part of this district is small, mere oases in a land of semi-arid foothills. These higher lands receive a good soaking in the winter season, and produce a variety of native grass that is very resisting to drought and very nutritious, remaining as natural hay in the dry season. Cattle, sheep, and goats are pastured upon these hills, giving a combination of pastoral and agricultural pursuits, much like that found in some parts of California and New Mexico.

Before Santiago is reached the central valley of Chile may fairly be said to begin. This valley, running southward, is the striking counterpart of the great valleys of California and Oregon, in latitude, climate, rainfall, products, and physical features. It extends from the sunny region of irrigation and sub-tropic fruits to the dripping forests on the cool shores of the southern gulfs. Its length is about 700 miles, the width varies from 20 to 100 miles, according to the windings of the Andes, and the coast range, which here as in California runs close to the ocean, cuts off the valley from the sea. This range is, however, not so continuous as its Californian

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* Chile's recent metal exports have been as follows:

	1899.	1900.
Copper, tons	19,020	25,178
Copper ore	35,854	20,210
Gold, grammes	1,625,330	1,871,130
Silver, grammes	75,503,518	45,438,178
Manganese ore, tons	——	25,715

† Engineering Magazine, Vol. 8, p. 31.

counterpart, having a number of breaks through which rivers reach the ocean at frequent intervals so that the really continuous valley has a number of drainage systems and a number of outlets to the never-distant ocean. These openings are marked in almost every case by ports, and five* railroads give easy connection with the numerous steamers that ply up and down the Pacific, the greatest commercial artery of Chile. This number of outlets is an advantage not shared by the Californian Valley with its high walls and single outlet at the Golden Gate. The divides between the river basins are not high enough to break the continuity of the Chilean valley, which is traversed from north to south by a trunk line of railway soon to have the last section completed and connect Valparaiso and Santiago with Port Montt on the southern inland sea. With its branches to the coast ports and the different parts of the valley this system is more than twice as long as the distance covered, and is being extended.

This great valley is a region of exceptional fertility and rather more than half of it, from the vicinity of Concepcion northward, needs irrigation for successful agriculture. Nature has made this easy.† The valley is usually flat and traversed by many streams fed by the melting snows of the Andes. In some districts these waters are so charged with mud that they annually fertilize as well as irrigate the fields of the farmer.

Like the corresponding region of California the warmer parts of this valley are well suited to the grape, orange, and other sub-tropic fruits. From Huasco southward 500 miles the grape thrives and in a part of the district excellent raisins are produced and the wine industry is pursued in many localities. In the valley of the Aconcagua near Santiago vineyards extend as far as the eye can see, and the annual grape crop is estimated to be sufficient to make a million gallons of good claret, but it is used to make the native drink "chicha."‡ The Chilean wines are of good quality, and some of them are made with the best modern appliances. The import of foreign wines is steadily declining, an export trade is arising and the country has the natural resources for its considerable extension, although its progress is not rapid. From 1897 to 1901 the value of wine exports averaged about $50,000 (American currency), sent chiefly to Ecuador and Peru.

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* Others are in prospect.

† "A great plain, probably an old lake basin, spread out between the two ranges, its flat surface here and there interrupted by the emergent summit of a buried hill." —Sir Martin Conway, in *Aconcagua and Tierra del Fuego.*

‡ See *Commercial Relations of the United States*, 1898.

Around Santiago oranges and lemons are grown and the valley southward to about 37° S. is treeless, irrigated, and devoted to general agriculture. The Lombardy poplar tree is very commonly grown along the irrigation ditches, and there are plantations of eucalyptus for timber purposes. Between 37° and 38° S. latitude, the rainfall increases so that irrigation is unnecessary and the forests which occupy the foothills of the Andes for 200 miles farther north now creep into the lowlands and become general on the valley floor. The rainfall increases with the latitude, so that Valdivia and Port Montt have about 100 inches per year,* and are excessively wet. The agriculture of the forested section is essentially temperate in its character and the greater part of the wheat crop is here produced.

The forested part of the Great Valley is a new country. Some of it is now being opened up, and much of the surface is still in forest. This is the old home of the Araucanian Indians, and they still live there. The Bio Bio River was their northern frontier until 1884. Since that date the Government has built railroads into the forests, encouraged colonization and made advances and given free land to European immigrants. As a result the population from near 38° southward to Port Montt is a mixture of Chilean, Indian, and German. When the forest lands are cleared they make fertile fields, and the stumpy new ground of this region resembles the new clearings in the neighbourhood of Puget Sound and the Columbia River. The town of Temuco (38° 40′ S.), on the line of the new railway, is a town of 20,000 population. It was founded in the woods in 1887 and resembles an American frontier town† in its plan, structure, and the surrounding agriculture. Valdivia and Port Montt (not yet reached by the railway) are usually described as being German settlements where many of the customs and industries of the Vaterland are transplanted intact. Valdivia is the centre of the brewing industry in Chile. Southern Chile, in addition to agriculture, has a lumber industry, and there is considerable tanning, for which the forest supplies the necessary tanbark. Sole leather is regularly exported to Europe, and the domestic shoe supply is nearly all made of native leather.

South of the great valley, which may be said to end at Port Montt, there are some agricultural colonies in the island province of Chiloe. The climate is rainy, the winters have heavy snow, and the sparse population of this inhospitable province is not increas-

* Conway. *The Andes and Tierra del Fuego*, p. 127.

† Carpenter, *South America*, p. 243; W. A. Smith, *Temperate Chile.*

ing rapidly. There is some timber-cutting and the agriculture is that of the cold temperate zone. The apple grows wild in this island and some of the fruit is exported to the mainland.*

Chilean agriculture does not play an important part in the foreign trade, nor does it promise to do so. Witness the accompanying statistics of production. According to the Chilean Bureau of Statistics the acreage and production for 1901 were as follows:†

	HECTARES.	HECTOLITRES.
Wheat	249,865	3,749,835
Barley	41,314	731,647
Maize	20,087	305,248
Beans	27,438	403,978
Potatoes	47,434	4,093,612
Alfalfa	29,286	.....
Clover	32,320	.....

The Government is making great efforts to spread a knowledge of technical science, and agriculture may be improved thereby, but the accompanying policy of protection and the consequent increase of urban population gives an increasing home demand. This stimulus of science‡ that is helping agriculture is also working with equal force to promote manufacturing industries, which will tend to cut off export of raw product. The export of wheat, which has been important for many decades, has, for the present at least, disappeared, and considerable imports have taken place. From 1892–96 the wheat export averaged a little over 111,000 metric tons § per year, and there was also some flour exported. From 1897–1900 the wheat export declined to a nominal figure, and in 1901 over 130,000 tons of wheat and flour were imported.‖ This condition was due to a bad harvest, but there is not much promise of a return to the export rank. One-crop farming has reduced the

* Chile also owns the Juan Fernandez Islands, famous as the home of Robinson Crusoe. They are reported as having good grass and fruit trees, the descendants of those planted by Selkirk 200 years ago (U. S. Consular Report, Advance sheets, Apr. 4, 1902). A prosperous lobster-canning plant is now in operation, but there are no permanent inhabitants.

† *Bulletin of Bureau of American Republics*, Vol. 14, p. 1042. A hectare equals 2.471 acres and a hectolitre 2.838 bushels.

‡ Among other agencies the Government supports an agricultural college, technical school, weather bureau, fish commission. There is, however, no agricultural journal in the country. The United States and Canada support 543.

§ Metric ton equals 36.73 bushels.

‖ See Bulletin of Bureau of American Republics, Vol. 10, p. 875–7, Vol. 13, pp. 62 and 1594.

yield of the new fields, and rational agriculture, here as elsewhere, makes slow progress. There is some barley exported from the southern districts, potatoes are sent to the equatorial countries to the north, alfalfa hay is shipped to Peru, and occasionally to Brazil and Europe, about 3,000 tons each of wax and honey are exported, also some walnuts, but none of the articles are in great quantity or give great promise for the future. Further explanations for this are found in the backward agricultural methods and in the small area of Chile's agricultural lands.

The agricultural methods are not thoroughly modernized. The slow ox is the only draught animal in agricultural work.* American and European farm machinery is imported, but a considerable percentage of the farmers still plough with the wooden plough used in the time of Pharaoh, reaping is often done by hand, and treading out the grain is a popular form of threshing.† The agricultural lands of Chile are practically all comprised within the Provinces beginning with Coquimbo on the north and extending to Llanquihue on the south. These Provinces have a combined area of 90,000 square miles, from which 15,000 should be immediately deducted on account of the semi-deserts of Coquimbo and the half of Llanquihue that is south of the Gulf of Corcovado. The remaining 75,000 square miles‡ include the slopes of the Andes, the coast range, and many untillable hills in the north. From this rather restricted area nearly three millions of people are to be fed, and if they develop any extensive agricultural exports these will probably be fruit products, wine, raisins, and dried fruits. These crops require small area for their cultivation, and with her fertile valleys, glacial streams, and warm sunshine, central Chile has the natural equipment to compete with any land in their production.

The chief present and prospective claim of the agricultural section of Chile upon the goods of foreign countries is in return, not for exports to Europe, but for exports to the desert provinces of the north. The nitrate workers consume the products of agricultural Chile and pay for them with nitrate sent to Europe and the

* Carpenter, *South America*, p. 252.

† This is called "la trilla." The sheaves of wheat are laid on the earth in a circular pen. Thirty or forty horses are turned in, and men, by shouting and lashing from the outside, keep the horses racing over the straw till the grain is threshed out.

‡ This area is about half as large as that part of the Pacific coast that remains after eliminating the two-thirds of Washington and Oregon that lie to the east of the Cascade Range and a third (more or less) of California that is virtually desert. California, Washington, and Oregon have a combined population of two and one-half million and California wheat export is not as great as in former years.

United States. The mineral industries of the four northern provinces require the presence of nearly or quite a quarter of a million of people and a large number of work animals in a desert where every handful of horse feed, every wisp of hay, and every bit of bread, meat, fruit, or vegetable must be imported. The supplying of this territory is the real export trade of agricultural Chile, and it is a heavy and growing demand. The foreign goods imported at Valparaiso are chiefly paid for with nitrate of soda exported from Iquique and Antofagasta.

The pastoral industries of Chile are somewhat like the agricultural in their relation to the foreign trade. Throughout the agricultural belt the conditions are suitable for cattle and sheep, and there is a regular export of wool, but the limited area of the country leaves no room for extensive pastoral industries, and here, as in other branches of agriculture, Chile appears insignificant when compared with her rival across the Andes.*

The cattle industry as pursued in Chile resembles that in the United States east of the Mississippi, where stock cattle from the ranges on the Great Plains are fattened on the farms. The Chilean stock cattle are driven over the Andes from the plains of Argentine and fattened on the alfalfa fields in the irrigated valleys at the western foot of the Andes. In recent years a tariff in favour of the land and live-stock owning class has considerably reduced this import of cattle, and the increased area required for their pasturage at home is advanced as one of the reasons for the decline in wheat production.

V. Patagonian Chile.

Until the latter part of the 19th Century that part of South America lying between 43° S. and the Straits of Magellan was an unknown and unclaimed no-man's land, like Central Africa. While Africa was being partitioned, Chile and Argentine extended their claims over Patagonia, but most of the land has remained unsettled and even unknown until the present time. The recent boundary dispute between Chile and Argentine has given a great stimulus to exploration in a region that greatly needed it, for little was known

	SHEEP.	CATTLE.
* Chile, 1901	1,335,332	829,953
Argentine, 1900	120,000,000	28,000,000

Figures for Chile from Bulletin of Bureau of American Republics, Vol. 14, p. 1042; for Argentine from Bulletin of Amer. Geog. Soc., Vol. XXXV, p. 133.

The ratio of sheep to population is about the same in Chile as in United States; of cattle, a little more than half.

save that the Chilean Andes and the Argentine Pampas had some sort of a southward extension. So late as 1898 a Government exploring party for the first time discovered the source of a river 25 miles long flowing down from an outlying spur of the Andes through a forested valley and reaching a fiord-like arm of the Gulf of Corcovado about 40 miles east of Port Montt.

The many exploring expeditions sent out by both parties to the boundary dispute have greatly increased our store of knowledge concerning Patagonia and raised the estimate of its economic worth. To the traveller, steaming up the inner channel of this coast with its labyrinth of fjords and islands,* the land appears hopeless for the uses of man. Glaciers crowd down the sides of precipitous mountains that are gloomy with almost perpetual mist and rain, and covered at every possible point with an evergreen forest, thick with matted underbrush and bamboo. The persistent west wind gives a heavy rainfall, reaching the maximum about 44° S. The explorer is sometimes delayed by two or even three weeks of steady rain, and progress in the forest must be made over a mucky mass of rotting vegetation into which a man often sinks to his knees and where beasts of burden cannot go. Permanent settlements are not likely to be made here, but the inhabitants of the Island of Chiloe have cut timber along the whole length of the coast.

Conditions inland are better. In latitude 40° S. the river Hua Hum cuts through the Andes, and from that point southward to the Straits of Magellan, the Pacific streams, some of them rivalling the Thames, the Seine, and the Potomac in volume, have cut clear through the mountains and often take their rise in the flat plains to the east of the Andes. The summits of the mountains are along the very margin of the sea, or it is even possible that they may be upon islands. These mountains protect in ever-varying degree the valleys of the Pacific rivers from the drenching winds that constantly blow in from the ocean. One explorer† calls these valleys "subandine," and they often contain considerable areas of open pampa land suitable for agriculture and especially for cattle-raising. Deer are now abundant. There are many glacial lakes and valuable forests of birch, cedro, and alerce, a kind of redwood allied to the California species and highly prized for shipbuilding and many other uses. In the valley of the Yelcho (about latitude 43° S.), besides much land ready for settlement, explorers report large

* It is said by Sir Martin Conway to be the most intricate coast-line in the world.

† See Royal Geographical Journal, Vol. XVI, pp. 29 and 186; Peterm ann's Mitteilungen, 1899, pp. 47 and 124–5.

XUM

alerce forests with trees from four to six and even ten feet in diameter. On one of the tributaries of this stream are several hundred Welsh farmers and cattle-growers who have emigrated overland from Chubut on the Atlantic coast in Argentine. The comparatively dry climate of these valleys is evidenced by the traces of extensive and destructive forest fires that have swept in from the more arid east. They can never survive to reach the drenched shore of the Pacific.

The timber of these forests can in many cases be rafted down to the Pacific, and there is reason to believe that this region, so long unknown, will during the next decade or two be subjugated to the use of the civilized and trading man, thereby following in the fate of the Great Plains of the United States, Canada, South Africa, Australia, and Argentine.

The extreme south of Patagonia, including the long-dreaded Tierra del Fuego and the southern archipelago, is already a seat of civilization and trade. Physically the district is a continuation of the region to the north, but with lessened rainfall. On the west the southern extremity of the Andes, wrapped in mists and evergreen forests, bends around toward Cape Horn and shelters the grassy eastern pampas from the full fury of the west winds which blow so fiercely in these latitudes.

The southern district is cut from east to west by the Strait of Magellan, a narrow and tortuous passage 300 miles in length, and an important part of one of the world's great trade routes. On the north shore of the Strait, located near the boundary between forest and pampa, is Punta Arenas, the southernmost settlement in the world and a thriving town of more than 10,000 people, of whom 1,500 are Austrians. It is too cloudy for wheat to grow, but potatoes, cabbage and hardy vegetables thrive; the climate is salubrious, and it is the only place in South America where there is skating. Many steamers call *en route* from New Zealand and Western South America, and the shipments of wool and frozen meat are increasing. All of the pampa, as far as the Argentine boundary, 75 miles to the north, was taken up as sheep ranges by 1898, most of the owners being English. South of the Strait, in Tierra del Fuego, one English company had leased a tract embracing a degree of latitude and capable of pasturing half a million sheep. It is reported that this island had, in 1896, 70,000 sheep, 1,000 cattle, and 500 horses, and that they had increased threefold by 1900.†

Conway, *The Andes and Tierra del Fuego*, pp. 227–32.

† Petermann's Mitteilungen, 1901, pp, 204–Literaturbericht.

Wild cattle live in the dense forests to the west of the pampas, and, as many of these forests contain little valuable timber, they are probably destined to be reduced to cattle pastures, as cattle can thrive better than sheep in the wetter climate.

Punta Arenas is the shipping point for the gold from the surrounding district. In 1899 the shipments were $5,000 per month, and for the year 1901 it was estimated at 100 kilograms, or about one-ninth of the production of the country. The greater part of Chilean gold is produced in the mining regions of the north.

VI. Economic Conditions and Prospects.

The extraordinary development of the nitrate industry has put the finances, commerce, and industry of Chile in a very peculiar position, and one bordering upon unstable equilibrium. The possession of the nitrate fields raises the Government property to 636 million pesos, while all the private property in the country amounts to but 1,436 millions. This one industry has doubled the national commerce, tripled the revenue, and now furnishes two-thirds of the total exports and over three-fourths of the national taxes. If any scientific discovery or other cause should abolish or impair the nitrate industry, serious and painful economic, fiscal, and probably political readjustments would be necessary. The great increase in revenues has not gone into permanent improvements, but to multiply offices for the members of the dominant party. A burdensome navy has been built with foreign borrowings.

The industrial depression of the years 1890–95 caused the adoption of a strong protective tariff, and great efforts are being put forth to convert Chile into a manufacturing country. Foreign capital is being invested, and many new industries are being established, producing such commodities as woollens, cement, chemicals, paper; the first match factory and cotton mill were recently opened, and Chile boasts the only nail mill in South America. But the cotton mill does no spinning, and the nail mill imports its iron, although there seems to be an abundance of iron ore in the country.*

As for coal, the other necessity in iron manufacture, Chile is not so well supplied. There are considerable deposits about latitude 37° and 38° S., also in Valdivia, and there are occasional outcrops throughout the southern archipelago to Tierra del Fuego. The

* In 1901 the total foreign trade was as follows: (Values in American gold):

Imports	$50,735,279
Exports	62,832,917

See Commercial Relations of the United States, 1902, p. 731.

only mining centre of importance is between Concepcion and Levu, and Coronel and Lota are the shipping ports. Some of the mines are directly on the seashore, and coal is actually raised from under the Pacific. The mines are from 500 to 1,000 feet deep, and working veins from 2 to 5 feet thick, and the quality is lignite.* Less than a million tons are annually produced, and it is widely used for steam purposes, much being taken away from Coronel as bunker coal by foreign steamers.† The native coke is brittle, and the supply for metallurgical purposes must be imported, and Chile imports from the United States, Europe and Australia as much coal as she produces. The import is chiefly taken by the mineral ports at the north.

The southern part of the Great Valley possesses an abundance of water-power for industrial purposes, and some of it is being utilized for electric installations.

There were at the end of 1901 2,880 miles of railway in Chile, 1330 belonged to the State, and 1550 to private companies. Most of the private lines are in connection with the mining industries of the north, the state lines being chiefly restricted to the more populous region between Valparaiso and Valdivia. This system is soon to be finished to Port Montt in the south, is being extended in the Great Valley, and there is a project under discussion to extend it several hundred miles northward; but it is chiefly for strategic purposes.‡ The real trunk route of Chilean commerce is the free and open Pacific, and the chief commercial function of the railways is

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* In the departments of Vallenar, Freirina, Serena, Ovalle, Illapel and in the central region, Tiltil, Pampa, Maipo, "exist extensive deposits of hematite and magnetite, some of which assay as high as 66% of metallic iron." These ores are mostly well below the limit of sulphur and phosphorus and often associated with manganese, of which ore there is considerable export. See Engineering Journal, Vol. 8, p. 31.

† The export in 1900 amounted to 325,000 tons, about one-half of the production.

Typical analysis:

Volatile matter	40.5%
Fixed carbon	50.7
Water	4.9
Ash	3.9
	100.0%

Engineering Journal, Vol. 8, p. 36.

‡ The transandine line to connect Valparaiso with Buenos Aires needs the completion of a tunnel and a few miles of mountain work. It has remained in this condition for a number of years owing to the strained diplomatic relations of the two countries, but there is now prospect of its early completion. The Chileans anticipate the shifting of much of the commerce of Mendoza and western Argentine from Buenos Aires to Valparaiso because the Pacific is so much nearer than the Atlantic.

to serve as feeders to the numerous ports. Nine hundred and seventy miles of navigable rivers also assist in this service.

Steamers from New York and Europe to Western South America call at a dozen or more ports in Chile. Of these Valparaiso, the port for the capital, is the most frequented, having the bulk of the import trade (although not of the export), and entrances of 1,545,072 net tons of shipping in 1900 and 1,938,160 in 1901.

In the slow growth of her population one sees the apparent limitations of Chile's economic future.* There has never been any large immigration. In the thirty years, 1857–1897, Argentine received 2,275,521 immigrants, and Chile but 38,528; and in the year 1897 Argentine received 105,000 and Chile 885.† The foreign population in 1895 was about equally divided between the following nationalities: Spanish, French, Italian, German, British, the numbers ranging from 6,000 to 8,000 each. European emigrants of the labouring class are not likely to go to a country where the wages and standard of life are lower than their own and where brigandage and local hostility to the foreigner are common and the justice of the courts cannot be relied upon. The Chilean population is said to have doubled between 1843 and 1875. The national census of 1895 reported a total population of 2,712,145, an increase of but 7.3 per cent. for the previous decade. The density of population, as shown by the accompanying table, indicates the condition of industrial development in the different provinces. The movement of population between the provinces in the census periods 1885–1895 indicates the industrial changes in progress. The boom in the nitrate fields doubled the population in the provinces of Antofagasta and Tarapacá. The opening of the new lands in the southern forests gave an increase of 135 per cent. in Cautin, 65 per cent. in Malleco, 25 per cent. in Llanquihue, and 20 per cent. in Valdivia. With the exception of Santiago, containing the national capital, none of the provinces of the older central district showed any large increase, and several of them lost by emigration to the more prosperous districts. This loss was heaviest in the provinces on the border of the agricultural zone and the desert. Aconcagua and Atacama lost 25 per cent. of their population and Coquimbo 10 per cent. The attractiveness of other provinces was increased by the depression

* This lack of increase "causes a deep anxiety of the authorities." In physical condition and numbers the population appears to be suffering the consequence of sexual license. "* * * The results of moral impurity amongst all classes and both sexes is acknowledged among themselves to be more than serious."—W. A. Smith, *Temperate Chile*, pp. 37–40.

† Bulletin of Bureau of American Republics, Vol. II., p. 465.

in the copper industry in this district, due to lowered prices. On the southern border of the irrigated section, the three neighbouring provinces of Maule, Linares, and Talca were slight losers in population, evidently because of the new lands being opened up in the better-watered district to the southward.

CHILE.	AREA, SQUARE MILES.	POPULATION, 1895.	POPULATION PER SQ. MILE.
PROVINCE.			
Atacama	28,330	59,713	2.01
Antofagasta	47,932	44,685	.9
Tarapacá	19,306	89,751	4.6
Tacna	8,688	29,523	2.8
Coquimbo	12,873	160,898	12.4
Aconcagua	6,226	113,165	19.3
Valparaiso	1,659	220,756	134.9
Santiago	5,223	415,636	79.5
O'Higgins	2,524	85,277	33.7
Colchagua	3,295	157,566	41.5
Curico	2,913	103,242	35.4
Talca	3,678	128,961	35.
Linares	3,589	101,858	29.2
Maule	2,931	119,791	40.8
Ñuble	3,556	152,935	43.
Concepción	3,535	188,190	56.1
Bio Bio	4,185	88,749	21.3
Malleco	2,857	98,032	34.3
Arauco	4,248	59,237	13.9
Cautin	3,126	78,221	25.1
Valdivia	8,315	60,687	7.3
Llanquihue	15,444	78,315	5.1
Chiloé	9,653	77,750	8.1
Magallanes (ter.)	75,292	5,170	.....
	279,909	2,712,145	9.06

The industrial efficiency, as well as the intellectual alertness of a people, are indicated by their use of the mail and telegraph. In these respects a comparison between the Chileans and Americans is shown in the following table:

	TELEGRAMS PER CAPITA PER YEAR.	MAIL PIECES PER CAPITA PER YEAR.
Chile	47	12
United States	83	180

THE SWEDISH ANTARCTIC EXPEDITION, 1902–03.

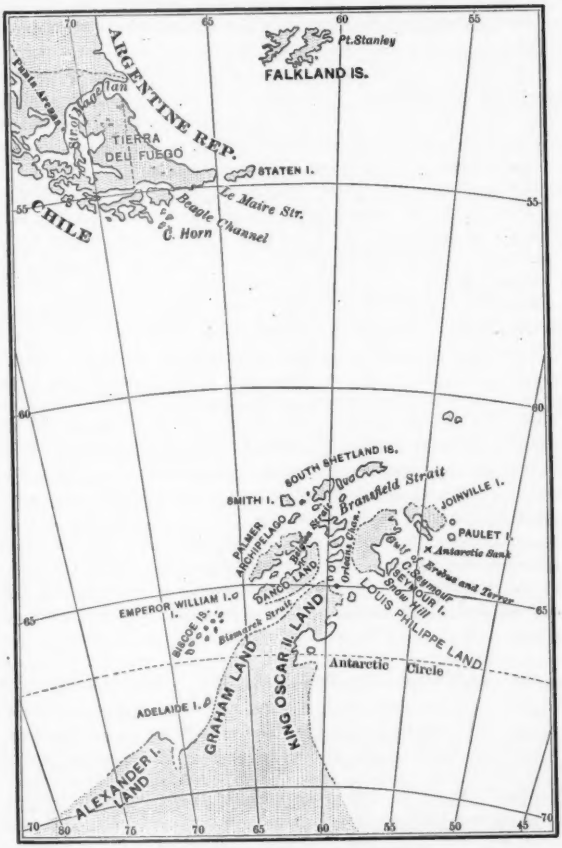
This expedition, led by Dr. Otto Nordenskjöld, has returned after unusual vicissitudes. It will be remembered that Nordenskjöld and five companions were left on Feb. 21, 1902, by their steamer, the *Antarctic*, on an island near the coast of Louis Philippe Land, not far from Seymour Island. A year later the *Antarctic*, returning south to meet the explorers and take them home, was crushed in the ice and sank about sixty miles from Nordenskjöld's camp. Three men from the *Antarctic* had previously landed on the coast; the other members of her crew reached Paulet Island with great difficulty after the sinking of their vessel. Neither party knew where the other was spending the winter, and Nordenskjöld did not know that the *Antarctic* was at the bottom of the sea and that his countrymen were in two camps to the north of him. All three parties have been rescued by the Argentine vessel *Uruguay*.

Dr. Nordenskjöld relates (London *Times*, Dec. 30, 1903) the adventures of his party and of the men of the *Antarctic* from the time he was left at his camp till their rescue. The following facts are taken from his narrative; and the accompanying map shows the region to the south of South America in which he spent two winters.

In the last days of February and the first weeks in March, 1902, the six men were busy constructing their houses and observatories. After starting the scientific observations attempts were made to begin sledge-work and plant supply caches further south. These efforts were defeated by persistent winds of hurricane force and low temperature. The party, accordingly, settled down to the winter routine in camp. Dr. Nordenskjöld writes:

> The meteorological observations were divided between Dr. Bodman and Lieutenant Sobral, though during the night watches the work was shared by the whole scientific staff. Dr. Ekelof was occupied with bacteriological investigations, and I myself used every opportunity to collect fossils and prepare the map of our surroundings.
>
> No one had anticipated that we should be compelled to remain so much within doors. It is true that, from the reports of the *Belgica* and *Southern Cross* expeditions, it was well known that the winter in the Antarctic is both severe and stormy; but who could imagine that we in our station, situated six or seven degrees further from the Pole, should meet with a considerably lower temperature than the first of the above-mentioned expeditions, and almost as low as the second, and at the same time should experience gales that in persistence, if not in strength, far surpassed those

encountered by the expeditions referred to? But so it was. April was the best month during the winter, but with the beginning of May there commenced a period of storms which, with short intermissions, never exceeding three days, lasted five months, until the end of September. During the whole of this time the average velocity of the wind was 23 miles an hour, and once, during a whole fortnight in May and June, it averaged 45 miles.



MAP OF THE GRAHAM LAND REGION.

"It is difficult to give an idea of these terrible gales. Our house was continually shaking, like the cars in an express train. Everything not solidly fixed was carried away, and after every storm we had to look for lost things. A large whaleboat lying on the shore was carried off hundreds of yards and crushed against the rocks. But what made the wind specially objectionable was that these strong gales from the southwest brought with them the lowest temperatures that we experienced—a feature

in a measure peculiar to the region. Thus, during the period mentioned in June the thermometer varied between — 25° and — 32° C. (— 13° and — 26° F.), and our stormiest day (mean velocity 63 miles an hour) was also one of the coldest (mean — 31° C., or — 24° F.). At such temperatures it was absolutely impossible to stand up against a wind of that force, and even in the daytime it became quite a difficulty to go as far as the observatories.

"So it came about that we had to pass a very long time indoors, more even, perhaps, than many expeditions wintering in the darkness of the night far nearer to the pole. Our house was small but pretty comfortable, with one large room 8 ft. by 14 ft. in the middle, and four smaller on the sides, one for the kitchen and three sleeping rooms for two men each. Over the whole house was a roomy loft, used as a store room. It was generally not difficult to keep the house warm, though we had hoped to get some snow to pile up round the walls, which, however, was never possible. Seal's blubber as fuel proved far superior to coal.

"I made during the winter several short sledge trips, though I was never absent for a long time. From the beginning of August, however, a good part of the time was occupied in preparations for a longer sledge trip southwards, which I had already contemplated before landing. We carried for the purpose a pretty good equipment of necessaries, and it was only in one point that we were seriously handicapped—the number of dogs at our disposal. Of the dogs I brought from Greenland all except four died on the way out, those four, however, being exceedingly fine animals. A number of pups born on the ship were frozen to death in a gale a few days after our landing before we had been able to arrange for them. The dogs I brought from the Falkland Islands proved not altogether unsuited to our needs, but most of them, and first of all the strongest and most courageous, had soon been killed by their ferocious Greenland companions. So for the expedition I could only use in all five dogs, a quite insufficient number, remembering that it was impossible, by reason of the smallness of our company, for me to arrange so that an auxiliary party should follow us with fresh supplies.

"My companions on the trip were Lieutenant Sobral and the sailor Jonasen. I took two sledges, the one to be pulled by the dogs, the other by two of the men. We carried provisions for 45 days, but calculating that we should go on the sea-ice, and that our load was already rather heavy, I took only about 20 days' food for the dogs."

The start was made on September 30. The weather was fine for ten days, and then violent storms resumed their sway. Passing out of Admiralty Sound a large inlet was discovered extending northward from the broken line on the map, which indicated this unknown part of the south coast of Louis Philippe Land. The explorer believed this to be

a large channel opening into Erebus and Terror Gulf and separating an archipelago of islands from the mainland. This mainland, the hitherto unknown connexion between Louis Philippe Land and King Oscar Land, is formed by a high range of mountain peaks separated by large glaciers and further inland passing into a level ice-covered plateau.

The party were unable to get further south than lat. 66°, long. 62° W., a little more than 200 miles from the station. The ice was

very difficult; no seals were found for dog-food and Dr. Nordenskjöld was compelled to turn back while still two degrees of latitude north of the point on the coast of King Oscar II. Land reached by Larsen in 1893–94. He was back at the station on November 7 after an absence of about five weeks.

Some very interesting discoveries were made on Seymour Island, to which the explorer made a sledge trip about December 1:

It was during an excursion to the northern point of that island that I made in one day two important discoveries. On a ridge of hills I collected numerous fossil bones of vertebrate animals, some of them of great size, and a little further south I found a layer rich in plant remains belonging to numerous species. And so there seems to be no doubt that in those remote regions, where now the vegetation is as much inferior to that of Greenland or Spitzbergen as that is compared with an English forest, the climate was once mild, and that there existed then large forests of leaf-bearing trees where birds sang and strange large animals fed on the herbage. That this has been the case in the north has long been known, but it is the first time it has been proved in the south.

At no time during the summer was the sea open enough for the arrival of the *Antarctic*, and the party began to feel uneasy about their relief. It was decided to lay in a supply of fresh meat, as they should probably have to spend another winter in that region. On February 6 they started for the rookery on Seymour Island. "We killed," writes Dr. Nordenskjöld, "about 400 birds,

which proved fully sufficient for our winter. However, to our taste, seal meat is much better than penguins, and it is specially to be remarked that it is impossible to get, even from a great number of penguins, grease enongh to serve as fuel during winter.

It was during those days that the ice-conditions were the best that summer. Much open water was seen in all directions on our east coast, and several times we imagined we saw the ship among the ice, But the winter was already setting in; strong gales, alternating with snow and snow fog, were blowing from all directions, sometimes with temperatures as low as —10° C. (14° F.); and a few days later, again nothing but ice was seen all round the horizon, and everybody was forced to acknowledge that we were going to pass another long winter in our old quarters. None of us knew that during those stormy days the *Antarctic* had fought her last fight with the ice.

From this time commenced for us the second winter. We had good stores of provisions brought from home, except meat, which, as already mentioned, was got from the game of the region. The only real difficulty was the isolation, which seemed the greater now that we had once considered the relief to be so near. But I never heard a complaint from any of my companions, and, in fact, our great consolation was that this second winter would give us far more ample opportunity to work for science than we could ever have expected. All the members did their best to find new ways to complete their researches.

Fortunately, this winter was far better than the former, not so much with regard to the temperature as to the gales, which were neither so strong nor so persistent as before. Here is a short summary of the scientific results obtained during the two years of wintering.

The principal object was the magnetic and meteorological observations. About the former nothing can here be recorded, the observations not yet having been worked out. An interesting though negative result was that in those two years we did not observe a single aurora australis. Of the meteorological results the most interesting is the unexpectedly cold climate of the region visited. The mean temperature for the first year was about —12° C. (10.2 F.), the same as in Hudson Strait or in Jakutsk, the two coldest places in the north, situated in more or less the same latitude as our station; at the same time it is several degrees lower than the temperature experienced by the Belgian expedition six degrees further south (14.7° F.). It is possible that this year was colder than usual, but as already stated the second winter was not very much warmer. What seems to be certain is that the summer was exceptionally cold; with a mean temperature of —2.2° C. (28.2° F.) it is the coldest known until now on the earth. In connection with this are to be considered the exceedingly bad ice conditions, that were so disastrous for us.

Interesting, too, are the great average velocity of the winds (the first year 20 miles an hour), their generally south-westerly direction, and the strength of the gales in the winter as compared with the summer.

As of geological interest, I have already mentioned the discovery of fossil plants and vertebrates, but besides this the island where the station was situated, as well as neighbouring islands, are very rich in fossils, all belonging to mesozoic or tertiary formations.

On September 29, 1903, Nordenskjöld started with sailor Jonasen and a sledge drawn by six dogs (two born at the station) to study the region north and northwest of the station. He turned into the great inlet discovered on the previous expedition. This channel afforded a view of the grandest scenery:

On one side was the magnificent range of King Oscar Land; on the other a large archipelago forming a remarkable contrast to the former and made up of tufaceous volcanic rocks, with sounds, glaciers, and promontories, all dominated by the shining blue-white prominent peak of Mount Haddington, probably formed by a mighty crater.

They advanced north till they had Erebus and Terror Gulf before them, and were travelling towards it when, on October 12, they saw far away some dark objects, which they at first thought were large penguins, but through the glass they discovered that two men were coming towards them. As they drew near, writes the explorer,

I saw two men, their faces coal-black, the eyes protected by rude wooden pieces; their black hair was hanging to the shoulders; their clothes were blackened and of an unknown shape. Even at the moment we met I had no idea who they were, and their first question—"Have you heard anything from the *Antarctic?*"—could not explain the situation.

It was Dr. Andersson, the leader of the expedition during my absence, and Lieutenant Duse, who, together with a sailor who was now preparing their dinner, had left the *Antarctic* at the end of December, the previous summer, when it became exceedingly dubious whether the ship could reach the station during that season. Their intention was to reach our station with a sledge. However, they soon found

that it was impossible at that time to reach the station owing to the state of the ice. So they turned back to a bay near Mount Bransfield, where a small depot had been put ashore and to which the *Antarctic* was to return. Here they passed the time agreed, waiting for the ship.

As months passed they began to grow anxious and prepare for winter, and in the beginning of March they moved into a small, low, stone hut. Here they passed seven long winter months. The construction of the hut was a difficult task, as the ground was frozen and they had no tools. They killed about 500 penguins for winter food, depending for fuel exclusively on seals. They had no books, and even if they had had they could not have read them by the feeble light of their blubber-lamp. The temperature inside was generally below freezing-point, and by reason of the gales they were for long periods confined to their berths composed of the bags and the few articles of clothing carried for the summer.

Notwithstanding this, their sojourn had not been without results. Mr. Duse had made a map of the surroundings, so that there is now, including the work of the *Antarctic* in the Orleans Channel, and my own work and that of Mr. Duse on our sledge-trips, a complete map of the whole coast from the southern end of the Gerlache Channel, on the west coast, to the turning-point of our first sledge expedition in latitude 66 deg., on the east. Dr. Andersson had found interesting proofs of the former greater extension of the glaciers, and what was more important, he had found a rich fossil flora of a very different type from that of Seymour Island and belonging to an older geological epoch. Now they were on their way to our winter station.

Andersson's sailor was picked up, and the five men made their way to Nordenskjöld's camp, much mystified over the fate of the *Antarctic*. The advancing summer, however, seemed very favourable for their relief if a vessel were sent for them. The ice was more open than at any time in the previous summer; and while the mean temperature for the latter half of October, 1902, was 0° F., it was in 1903, + 30°.

The Argentine relief steamer *Uruguay*, under Commander Irizar, finally arrived off this camp, and Nordenskjöld met her officers on Nov. 8 as he returned from Seymour Island with the first penguin eggs of the season. There was no news of the *Antarctic*, and the probability was now all too great that she had been lost with all on board.

But that very night the dogs set up a furious barking, and Dr. Bodman went outside the cabin to see what was disturbing them. A moment later he rushed back, shouting: "It is Larsen" (the Captain of the *Antarctic*). Larsen, with four men, had arrived on the very day that Nordenskjöld had first despaired of their safety. The story of the last voyage of the *Antarctic*, and of the fortunes of her men after she sank, was then told to eager listeners.

She left Tierra del Fuego on Nov. 6, 1902. West of the South Shetland Islands the party met heavy pack ice, through which they

pushed with difficulty. Reaching Bransfield Strait they found the region comparatively free of ice, and here they worked for some time, obtaining a very interesting series of soundings as well as collections of animals and plants unexpectedly rich even compared with what we had seen the first summer. At the same time a chart was made of the Orleans Channel as far as where this passes into the Gerlache Channel.

This work having been finished, the intention was to proceed to the winter station, but now the difficulties really began. They soon found that the whole of Erebus Gulf was filled with ice, and when they tried to pass eastward of Joinville Island they were caught by the ice and drifted with this as far north as Elephant Island. Eventually, however, by dint of hard work, they got free of the ice and, trying again to find a way through the strait west of Joinville Island, they there passed Christmas, with the nearest land in sight, though at a distance of about 60 miles. It was now that Dr. Andersson and Mr. Duse decided to make the sledge trip, the result of which has above been related. During this time the *Antarctic* had to try her luck another time eastward of the land.

It was now late in the summer, and, though the ice conditions were clearly hopeless, there was nothing else to be done except to press on. Struggling hard, they passed round Joinville Island, during the first days of the new year, and through a narrow opening in the ice they could advance several miles to the south. But here they were again caught by the ice, and drifted north until, on January 10, a strong gale from the south commenced, filling the bay and setting the ice rapidly against the northern shore. The steamer was at that time fast in the ice about 20 miles south from Dundee Island. The storm keeping on, the ice began to press very heavily, lifting the ship about 4 feet. The situation was most perilous, and the disaster came with a big ice-floe, with strong pressure-ridges, rising high out of the water. From this ice emerged a large ice-foot which, catching the steamer from underneath, broke the rudder and the keel, bent the axle of the screw, and tore up the bottom of the ship, fixing the vessel at the same time solidly in its embrace.

Only after three weeks' hard work was it possible to release the steamer from the grasp of this ice-foot. The pumps were working all the time, and when the ship got free the leak proved too great to be managed with the resources on board. For another week the vessel drifted in the ice without finding a way out. Had it only been possible to bring the ship to the beach while still afloat the stores and provisions, as well as all our valuable collections, could have been saved. But even this proved impossible, and the same head gales in the beginning of February that raised our hopes in the station were disastrous for the ship. On February 12 the *Antarctic* was abandoned, and an hour later she was buried in the sea.

The question was now to bring the men and as many as possible of the most important things over the drifting pack-ice to the land selected for winter quarters, the small, volcanic island of Paulet, known to be rich in seals and penguins. This, under the admirable direction of Captain Larsen, was executed during the following sixteen days. Three boats were carried, used as sledges and pulled by the party, to take the outfit. The advance was very difficult, and many times in the morning the whole party found themselves carried away by the strong currents much further from their goal than before the whole work of the foregoing day. Gradually more and more of the things were lost, and at last, when they arrived at the open land at the foot of the island and had to put out the boats, only a small part could be saved. The travellers were barely on the shore when a storm broke out, carrying off the ice

and making it impossible to think of returning to bring on shore the part of the outfit left on the ice.

A stone hut was built, and in this the twenty men passed the winter, using for food the meat of seals and penguins that could be obtained, and also catching a good number of fish, which proved a very welcome change. What was most scarce was fuel, as the seals were by no means numerous during the winter. It was a hard life; but happily all were in good health, except the young Norwegian seaman Wenersgaard, who died of heart affection in the middle of the darkness and the gales of the winter on June 7. It had long been arranged that a small party should start for the winter station to bring us news of the fate of the *Antarctic* as soon as the ice would allow. On October 31 they started, and, passing the site of the winter hut at Mount Bransfield, where they learnt the news of how that party had spent the winter, they arrived at our station just at the last moment when we were going to leave definitely the place and the region.

And now came the last great event in the story of the expedition. After having embarked on the *Uruguay*, the 10th, we passed very early the next morning Paulet Island, awakening its involuntary inhabitants with the steam whistle of our ship. The effect was instantaneous—in a second the beach was alive with men, still unable to understand their luck. The change was too great, after all their privations, with the dark prospect of the future, to be suddenly awakened out of their sleep, placed in the midst of civilization, and at the same time know that all their companions from the two other winter stations were well, and all this to happen so early in the year, when no relief could have been expected.

It was undoubtedly a great proof of the awakened interest of the Argentine nation and of the capacity of its navy to send this expedition, and to us the stay on board has only bright remembrances, for we were received as I believe has rarely been the lot of a shipwrecked expedition. Passing the winter station of Mount Bransfield to pick up the collection left there, we arrived at the port of Santa Cruz on November 22, and during the following hours the telegraph announced to the world the news of our return.

NOTES ON GEOLOGICAL SURVEYS.

West Virginia.—Volume I of this survey was issued in 1899, under the direction of J. C. White, State Geologist. It contains records of levels above tide and of the variations of the magnetic compass, but is chiefly devoted to petroleum and natural gas, including the local history of development, the geological relations, and detailed records of many borings. Volume II bears the date 1903, and is chiefly occupied with the coal formations of the State. Incidentally, the author emphasizes the richness in common minerals, soils, and forests of a State which is quite lacking in costly metals. Ten to twelve thousand square miles is given as an estimate of the productive coal territory of West Virginia. The

author expresses the interesting opinion that the coal measures may originally have extended to the Blue Ridge, across the Shenandoah Valley. The first statistics of production belong to 1873, with 672,000 short tons. The State passed Ohio in 1895, and will soon outstrip Illinois, and become, in this product, the second State in the Union. In 1901, 24,000,000 short tons were mined. Of this amount between three and four million tons were made into coke. It is expected to follow with Volumes III and IV on the clays, ores, building stones, and other mineral products of the State, which has entered into co-operation with the United States Geological Survey to carry on topographic map work.

NEBRASKA.—Volume I of the Nebraska Geological Survey has recently been received, Professor Erwin H. Barbour of the State University of Lincoln being State Geologist, with a considerable corps of assistants. The present volume is a non-technical, introductory account of the physical features of the State, based on the voluntary investigations of the past ten years. Much of this work was due to the private beneficence of Hon. Charles H. Morrill, of Lincoln. The failure of the citizens of the State to provide for the study of its natural resources is attributed to its poverty in coal and the various metals. But, to atone for this lack, there are abundant clays, cements, ochres, and building stones needing development. To this end a vigorous appeal is made, and it is stated, for example, that single individuals have spent twenty thousand dollars prospecting for coal, chiefly in the Pierre shale, which the geologist knows to be barren. Studies of the physiography and hydrography of Nebraska follow, which should be of much service to teachers and others who wish to know the geography of the State. There are also chapters on stratigraphy and mineral resources.

WASHINGTON.—Few States offer such variety of physical features and mineral wealth to the observer as this Far Western commonwealth. Volume I was published in 1902, embodying the work of 1901. Professor Harry Landes of the State University at Seattle is State Geologist. The report includes a summary view of the geology, the non-metalliferous resources, the iron, coal, and water. Sixteen pages are occupied with a bibliography of the geology of Washington. Volume II gives an extended account of the building and ornamental stones and further information concerning the coal.

MARYLAND.—The Survey in the State was established in 1896, and has made swift and continuous progress. Its publications are in excellent form and already make an extended series. The Survey sustains an intimate relation to the Johns Hopkins University through the State Geologist, Professor W. B. Clark, and his colleagues in the geological faculty.

Volume I bears the date 1897 and is introductory in character. It includes the origin and plan of the Survey; a historical sketch of the investigation of the physical features of Maryland; an account of the general physiography and geology; bibliography and cartography; and a report on magnetic work. The bibliography gives an extended series of titles occupying 170 pages, beginning with John Smith's description of Virginia in 1612.

Volume II, 1898, in addition to administrative reports, includes the building and decorative stones of Maryland, by George P. Merrill and Edward B. Matthews; and a report on Cartography, by Gannett and Matthews. A large section of the volume is occupied by Mr. Matthews' detailed story of the maps and map-makers of Maryland.

Volume III marks the undertaking of systematic work on the highways of the State, and is a model piece of work. Professor Clark discusses the general problems suggested by the climate, topography, and geology in their bearing on road construction. Highway legislation is treated historically in a further essay, and present conditions are outlined in general and by counties. Other chapters deal with construction methods, road-metal tests, and road administration. A supplement gives in full the laws of Maryland relating to highways.

Volume IV is of date 1902, and includes the Paleozoic history of the State, a further report on highways, and a report on clays, by Dr. Heinrich Ries. The last is a detailed discussion occupying 300 pages. In 1901 a volume on the Eocene of Maryland was published, and separate volumes give the areal geology of Allegany, Garrett, and Cecil counties, with maps in cases.

INDIANA.—The 26th and 27th annual reports for 1901–02 add another volume to the extended series put forth by this Survey for many years. The Survey has its headquarters at Indianapolis and Mr. W. S. Blatchley is State Geologist. The first special paper describes more than 80 mineral springs within the State. In this connection Dr. Robert Hessler contributes an essay on the medicinal properties and uses of Indiana mineral waters. The remaining

special papers of the 26th report deal with the geology of Southern Indiana and with the gas and petroleum industries. A somewhat surprising title, when we come to the 27th report, is "Gold and Diamonds in Indiana," by Mr. Blatchley. These minerals are, however, all due to transportation by ice, so far as their presence in Indiana is concerned. The drift furnishes gravels which, in limited areas, yield 25 to 40 cents per cubic yard, and might well be worked with approved hydraulic methods. The diamonds are of scientific rather than commercial interest, being small and found in the search for gold.

Iowa.—A State containing a simple series of Paleozoic rocks, overlain by glacial drift and prairie soils, might, to the average reader, promise little to geological investigation. To such it would be a revelation to observe the work of the present Survey, which was begun in 1892. As in many States, the State Geologist is a professor of geology, Dr. Samuel Calvin of the Iowa State University. Thirteen volumes of the annual reports have now appeared upon the various economic and more purely scientific phases of Iowa geology. A further indication of the fruitfulness of this field is seen in the 250 pages of bibliography which record studies previous to 1892. The reports deal chiefly with general stratigraphy, the glacial drift, and the areal geology by counties. The chief economic materials are the soils, coal, gypsum, road metals, clays, water, lead, and zinc. Since 1899 iron in moderate quantities has been produced.

An interesting chapter in Volume XIII, the annual report for 1902, discusses the lithographic limestone of Mitchell County. The principal layer in the quarry in question is quite free from the crystalline inequalities which often vitiate the limestone for lithographic use. It has the desirable intermediate degree of hardness, and agrees well with Bavarian samples in absorption tests. The Iowa rock is of Devonian age, while the Bavarian is Jurassic, some of the Texan is Cretaceous, and that from Kentucky is believed to be Carboniferous. The layer in question is about two feet thick, but there is some question whether thin slabs can be prepared whose surfaces will not cross minor bedding planes that show undesirable foreign material. The examination, however, was made without special quarrying, and it is hoped that more systematic work will develop practicable material. Lithographic views of the quarries in question are given in the report as executed upon the stone under discussion.

UNITED STATES GEOLOGICAL SURVEY.

CAPE NOME AND OTHER PARTS OF SEWARD PENINSULA, ALASKA.—The United States Geological Survey has, for several years, pursued actively the study of Alaskan geology and geographic conditions. Naturally, the gold discoveries of the Yukon and Cape Nome have lent impetus to the work. In 1900 Mr. Alfred H. Brooks and his assistants, Mr. G. B. Richardson and Mr. A. J. Collier, made a reconnaissance survey of the southern portion of the Seward peninsula, including Cape Nome. The report is found in House Document, Vol. 124, 56th Congress. The Seward Peninsula is the westernmost land of North America, and contains 20,000 square miles, of which 6,000 are embraced in Mr. Brooks' report.

The coastal plain and considerable upland areas are true tundras, and it thus appears that strictly plain regions are not all that must be embraced under this name, as is often implied. The peninsula is deeply incised on the west by the basins of Port Clarence and Imuruk, and by the lowlands of Kuzitrin and Kruzgamepa Rivers. North of this belt of lowlands and inclosed basins the York mountain tract stretches westward to Cape Prince of Wales, the most neighbourly point to the Asiatic continent. South of the belt of depression is the area concerned in this report. A central mass of highlands is much dissected by streams flowing north, south, and west. Midway of this seaward southern side is Cape Nome, and along the sea border east and west are either coastal plains of moderate width or wave-cut cliffs formed by the sea. The mountains are low, from 2,000 to 4,000 feet, with one summit, Mount Osborn, attaining about 4,700 feet.

Marine terraces and flat uplands show that the western part of the peninsula has, in comparatively recent times, been depressed below sea level, and the recovery has taken place with intervals of stability which allowed the carving of benches at various horizons. The highest of these benches observed is 1,700 feet above the sea. Others appear at 1,600 and 1,200 feet. Several levels are noted between 200 and 800 feet. Still lower terraces, as at 25, 50, and 100 feet, were observed. The main features of the topography were essentially completed before the submergence. The higher terraces merge with the flood plains of the larger rivers. Glaciation has been local, the ice occupying valleys in the mountain areas, producing some moraines and local changes of drainage.

The sedimentary rocks are referred to the Ordovician and Mesozoic, with numerous periods of igneous intrusions and dynamic disturbances. The Pleistocene deposits are given a fourfold

grouping: (1) Deposits of present rivers and along present shore lines; (2) marine and river terraces and the coastal plain; (3) glacial; (4) ground ice and residual soil. It will appear at once that the high-level gravels have a relation to the extension of placer working on the peninsula.

The reader will find at pages 64–69 an interesting account of the growth and conditions of the mining camps at Cape Nome, and in other parts of the region. At the time of Mr. Brooks' visit in June, 1900, 15,000 people were gathered at Nome. The most serious limit to human convenience there is exposure to the open sea and the complete absence of harbour facilities.

It was, of course, a prime practical end to determine the sources of the placer gold. On this the author states that the region is distinctly mineralized. Veins and lenses of quartz are common in the schists, showing, in some cases, chalcopyrite, pyrite, galena, and gold. The dust is locally derived, for nuggets are often too large and rough to have admitted of much carriage by water. Nuggets are also found still attached to the matrix of quartz and schist. The point is emphasized that large thicknesses of the rocks have been removed by denudation, and from these the gold has been concentrated. We need not wonder, therefore, if no single outcrops have been found in which specially rich veins appear.

The placer beds of the Cape Nome district are of several kinds—the famous beach deposits; the gravels in neighbouring creeks and gulches; the high bench gravels, and the gravel plains. The large yields have come from the beach and the stream courses, but the high benches will probably become important producers. Some of the claims near the source of Dexter Creek were so rich that their owners could afford to work them with water brought two miles at a cost of $2.50 a barrel. Local details for numerous localities in the central and southern part of the peninsula will be found in the report. The topography is shown by pictures, and in parts by contoured maps, and the geology is given in colours, so far as it could be worked out in a short Alaskan summer. There is also a map denoting areas of actual or possible gold production.

Mr. Arthur J. Collier adds a few pages of notes on the climate. As the oceans on the north and south differ widely in temperature, and the mountains are low, alternate movements of waters and of the atmosphere from the contrasting sea make a variable climate, which is less favourable, although averaging a little warmer than in the Klondike and adjacent parts of the Yukon basin. Mr.

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Collier also gives a review of the vegetation, which is of interest to botanists and others. What may fairly be called spruce forests occur in the eastern part of the peninsula. The trees are found along the rivers, and some were one foot in diameter and 50 feet high. Six species of grass were found, a partial list, and abundant lichens, known as reindeer moss.

The Norton Bay region at the southeast base of the Seward Peninsula was assigned to Mr. W. C. Mendenhall for geological reconnaissance. A fact of much physiographic interest is brought out, namely, that here the movement of the land has been downward, in contrast to the emergence of the more westerly areas. Irregular shore lines, drowned valleys, and tied islands furnish the evidence of this movement. The axis on which the peninsula turned appears to run north and south, approximately, from Cape Espenberg to Cape Darby.

Northwestern Portion of Seward Peninsula.—Work in this area was assigned to Mr. Collier in 1901, and his results are published as Professional Paper No. 2, U. S. Geological Survey, 1902. It will be remembered that Mr. Brooks made brief studies in this territory, as among the York Mountains, the previous summer. He had found stream tin, and efforts were made in 1901, though without success, to find the bed-rock sources of this mineral.

The north or Arctic shore of the peninsula differs from the south shore in showing a coastal plain 5 to 30 miles wide, bordered by lagoons and barrier beaches. The inland basins, east of Port Clarence, are like the coastal plain, but represent lakes or estuaries filled with detrital matter. Remains of the mammoth have been found both in the inland plains and in those of the Arctic shore. As farther to the south, so here the Pleistocene consists of beach-beds, terraces, and flood-plains of rivers, and high benches and terraces. There is no evidence of general glaciation, residual soils and gravels of local origin being the rule.

The general conditions of the bed-rock geology are similar to those of the southern district. The economic interests of the Arctic side of the peninsula do not compare with those of the Cape Nome slope. A few small placer areas have been worked, and are here described. These, with doubtful areas, and others believed to be barren, are shown upon the map. The two reports add much to our knowledge of the geography of this secluded region, and show also that considerable values will yet be harvested by more systematic exploitation and the use of more refined methods.

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Unfortunately, each winter's work of the sea blots out the traces of previous work along the Nome beaches, and leaves little clue as to where pay dirt will be found at the opening of the next brief summer. A. P. B.

THE EIGHTH INTERNATIONAL GEOGRAPHIC CONGRESS.

The National Geographic Society has issued the following announcement:

PRELIMINARY ANNOUNCEMENT, EIGHTH INTERNATIONAL GEOGRAPHIC CONGRESS, WASHINGTON, 1904.

HUBBARD MEMORIAL HALL,
WASHINGTON, D. C., U. S. A.,
January, 1904.

The Executive Committee of the Seventh International Geographic Congress, held in Berlin in 1899, having voted to convoke its next session in Washington, the National Geographic Society, as the organization responsible for the management of sessions in the United States, will welcome the Eighth Congress and its friends to the National Capital of the United States in September, 1904.

Geographers and promoters of geography throughout the world, especially members of geographic societies and cognate institutions of scientific character, are cordially invited to assemble in Washington, D. C., on September 8th, 1904, for the first international meeting of geographers in the Western Hemisphere.

On the invitation of the National Geographic Society the following societies join in welcoming the Congress and undertake to co-operate toward its success, especially in so far as sessions to be held in their respective cities are concerned:

The American Geographical Society.	The Geographical Society of Philadelphia.
The Geographic Society of Baltimore.	The Appalachian Mountain Club.
The Geographic Society of Chicago.	The Geographical Society of the Pacific.
The Geographical Society of California.	The Sierra Club.
The Mazamas.	The American Alpine Club.
The Peary Arctic Club.	The Harvard Travellers Club.

The Congress will convene in Washington on Thursday, September 8th, in the new home of the National Geographic Society, and will hold sessions on the 9th and 10th, the latter under the auspices of the Geographic Society of Baltimore. Leaving Washington on the 12th, the Members, Associates, and Guests of the Congress will be entertained during that day by the Geographical Society of Philadelphia, and on the 13th, 14th and 15th by the American Geographical Society of New York, where

scientific sessions will be held; on the 16th they will have the opportunity of visiting Niagara Falls (*en route* westward by special train), and on the 17th will be entertained by the Geographic Society of Chicago; and on Monday and Tuesday, September 19th and 20th, they will be invited to participate in the International Congress of Arts and Science connected with the World's Fair in St. Louis. Arrangements will be made here for visiting exhibits of geographic interest. In case any considerable number of Members and Associates so desire, a Far-West excursion will be provided from St. Louis to the City of Mexico, thence to Santa Fé, thence to the Grand Canyon of the Colorado, and on to San Francisco and the Golden Gate, where the western Geographic Societies will extend special hospitality; afterward returning by any preferred route through the Rocky Mountains and the interior plains to the eastern ports.

If the membership and finances warrant, the foreign delegates will be made guests of the Congress from Washington to St. Louis, via Baltimore, Philadelphia, New York, Niagara Falls and Chicago. On the Far-West excursion special terms will be secured, reducing the aggregate cost of transportation, with sleeping-car accommodations and meals, materially below the customary rates. It may be necessary to limit the number of persons on the Far-West excursion. It is planned also to secure special rates for transportation of foreign members from one or more European ports to New York, provided requisite information as to convenience and pleasure of such members be obtained in time. Final information on these points will be given in the preliminary program of June, 1904.

The subjects for treatment and discussion in the Congress may be classified as follows:

1. Physical Geography, including Geomorphology, Meteorology, Hydrology, etc.
2. Mathematical Geography, including Geodesy and Geophysics.
3. Biogeography, including Botany and Zoology in their geographic aspects.
4. Anthropogeography, including Ethnology.
5. Descriptive Geography, including Explorations and Surveys.
6. Geographic Technology, including Cartography, Bibliography, etc.
7. Commercial and Industrial Geography.
8. History of Geography.
9. Geographic Education.

A special opportunity will be afforded for the discussion of methods of surveying and map-making, and for the comparison of these methods as pursued in other countries with the work of the Federal and State Surveys maintained in this country.

Members of the Congress will be entitled to participate in all sessions and excursions, and to attend all social meetings in honor of the Congress; they will also (whether in attendance or not) receive the publications of the Congress, including the daily Program and the final Compte Rendu, or volume of proceedings. Membership may be acquired by members of geographic and cognate societies on payment of $5 (25 francs, one pound, or 20 marks) to the Committee of Arrangements. Persons not members of such societies may acquire membership by a similar payment and election by the Presidency. Ladies and minors accompanying members may be registered as Associates on payment of $2.50 (12½ francs, or 10 shillings, or 10 marks); they shall enjoy all privileges of members except the rights of voting and of receiving publications.

Geographers and their friends desirous of attending the Congress or receiving its publications, are requested to signify their intention at the earliest practicable date in

order that subsequent announcements may be sent them without delay, and that requisite arrangements for transportation may be effected. On receipt of subscriptions, Members' and Associates' tickets will be mailed to the subscribers. The privileges of the Congress, including the excursions and the social gatherings, can be extended only to holders of tickets.

It is earnestly hoped that the Congress of 1904 may be an assemblage of geographic and cognate institutions no less than of individual geographers; and to this end a special invitation is extended to such organizations to participate in the Congress through delegates, on the basis of one for each one hundred members up to a maximum of ten. No charge will be made for the registration of institutions, though the delegates will be expected to subscribe as members; and in order that the list of affiliated institutions (to be issued in a later announcement) may be worthy of full confidence, the Committee of Arrangements reserve the right to withhold the name of any institution pending action by the Presidency. The publications of the Congress will be sent free to all institutions registered. It is especially desired that the geographic societies of the Western Hemisphere may utilize the opportunity afforded by this Congress for establishing closer relations with those of the Old World, and to facilitate this, Spanish will be recognized as one of the languages of the Congress, with French, English, German, and Italian, in accordance with previous usage; and communications before the Congress may be written in any one (or more) of these languages.

Institutions not strictly Geographic in character, Libraries, Universities, Academies of Science, and Scientific Societies are especially invited to subscribe as members in order to receive the publications of the Congress as issued.

Members and Delegates desirous of presenting communications before the Congress, or wishing to propose subjects for discussion, are requested to signify their wishes at the earliest practicable date in order that the titles or subjects may be incorporated in a Preliminary Program to be issued in June, 1904. The time required for presenting communications should be stated, otherwise twelve minutes will be allotted. It is anticipated that not more than twenty minutes can be allotted for any communication unless the Presidency decide to extend the time by reason of the general interest or importance of the subject. The Presidency, with the complete Organization of the Congress (including Delegates), will be announced in the Preliminary Program of June, 1904.

All papers or abstracts designed for presentation before the Congress, and all proposals and applications affecting the Congress, will be submitted to a Program Committee, who shall decide whether the same are appropriate for incorporation in the announcements, though the decisions of this Committee shall be subject to revision by the Presidency after the Congress convenes.

Any proposal affecting the organization of the Congress or the program for the Washington session must be received in writing not later than May 1, 1904. Communications designed to be printed in connection with the Congress must be received not later than June 1, and any abstracts of communications (not exceeding 300 words in length) designed for printing in the General Program to be published at the beginning of the Congress must be received not later than August 1, 1904. Daily Programs will be issued during the sessions.

All correspondence relating to the Congress and all remittances should be addressed—

THE EIGHTH INTERNATIONAL GEOGRAPHIC CONGRESS,
Hubbard Memorial Hall,
Washington, D. C., U. S. A.

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The Committee in charge of the arrangements for the Congress has accepted the invitation of the American Geographical Society to hold two or three meetings in the City of New York. These meetings will be held on September 13, 14 and 15, at hours and places hereafter to be designated by the American Geographical Society.

Fellows of this Society will please take notice that membership in the Congress may be acquired on application, with a remittance of Five Dollars, to

THE COMMITTEE OF ARRANGEMENTS
EIGHTH INTERNATIONAL GEOGRAPHIC CONGRESS,
Hubbard Memorial Hall,
Washington, D. C.

Members of the Congress will receive the publications and enjoy the other privileges, as above noted.

GEOGRAPHICAL RECORD.

AMERICA.

MUIR GLACIER RETREATING.—Since 1899 excursion boats from Sitka have not been able to approach the main glacier nearer than from five to ten miles. The channel of Muir Inlet has been choked with ice. A series of severe earthquakes occurred late in 1899, and it is supposed the impassable condition of Muir Inlet is due largely to the consequent breaking down of the front of the glacier, which clogged the inlet with ice. In May last Messrs. Andrews and Case of Skagway forced their way with difficulty to the glacier, and discovered that its front had retired two and a half miles in four years, a higher rate of retrogression than had been observed before. The rate of recession for twenty years after John Muir rediscovered the glacier in 1879 was about a mile in seven years. The present indications are that before long Muir Glacier will cease to reach tide water.

FORESTS AND RAINFALL.—The local impression that for some years the Rock River of Wisconsin and Illinois has been decreasing in volume, or has at least been changing in the regularity of its flow, has led the Forestry Bureau to undertake a study of *The*

Diminished Flow of the Rock River in Wisconsin and Illinois and its Relation to the Surrounding Forests (Bull. No. 44, 1903, 27 pp., by G. F. Schwarz). The geology, the topography, the forests, and the rainfall have been carefully studied, and the results are of considerable interest in connection with the old, but ever new, question as to the influence of forests upon rainfall. The geological formation and the topography of the watershed of the Rock River are believed to favour a sustained water supply; but the forests have been cut down over considerable areas since the region became settled, and the conditions of growth in the remaining ones have changed for the worse. Woodlots and cultivated fields have been converted into pasturage, and this has interfered with the water-flow; while swamps and fields in many cases have been artificially drained. It is estimated that the total forest area at the time of the first settlements was 75 per cent., while now it is 30 per cent.; and whereas the forests originally contained a natural undergrowth of moss, herbs, seedlings, shrubs, and the like, which helped to retain the moisture, the forest mould has now become scant and thin, and grass and weeds have replaced the shrubbery and saplings. As regards rainfall, Weather Bureau records for the period 1885–1903 show a decrease in precipitation, and this loss must have lessened the volume of the river slightly, although the fluctuations in flow are believed to have been caused by artificial drainage and changes in the forest conditions of the region. While many persons would be disposed to jump at the conclusion: Deforestation and decreased rainfall, cause and effect, it is satisfactory to note that this *Bulletin* does not make any such deductions. Emphasis is laid on the fact that the changes in the conditions of the forest cover and of the forest litter have doubtless brought about changed conditions of evaporation and of the retention of moisture in the soil, and have thus affected the flow of the Rock River. The conclusion reached is as follows:

> While it cannot safely be asserted that forest destruction has produced any falling off in the annual precipitation over the region, the amount of water which finds its way into the streams—that is, the rainfall minus the evaporation—is somewhat less than it would be had the original forest conditions remained undisturbed (p. 19).

This is a conservative statement, which one likes to see in these days when so much which is quite unsupported by facts is said on this subject.

It may not be out of place to note that in the swing of the climatic pendulum towards a somewhat drier period, which has been noted at many stations in the western United States, begin-

ning about the middle 80's, Brückner has found satisfactory confirmation of his earlier conclusions as to a 35-year periodicity of climate (Pet. Mitth., XLVIII, 1902, 173–178).

R. DeD. W.

CLIMATOLOGY OF CALIFORNIA, by Alexander G. McAdie. U. S. Department of Agriculture, Weather Bureau. Bulletin L. 4to, 270 pp. Washington, D. C., 1903.

Professor McAdie, Section Director of the Weather Bureau at San Francisco, has for some years been paying special attention to the climatology of California, and has published numerous short articles on various aspects of it in the monthly *Bulletins* of the California Climate and Crop Service. The present volume of 270 pages, with numerous charts, curves, and half-tone illustrations, combines these shorter contributions, together with a great deal more of interest and value, into one whole, and constitutes the most complete account of the climate of any one State which our Weather Bureau has issued. Our general criticism would be the rather disjointed character of the report, and the apparent lack of any systematic scheme of presentation. The accounts of the climate of individual places or districts, when taken one after another, give the *Bulletin* somewhat the character of a climatological dictionary, with a good deal of the "dry" quality of such a publication. Extensive tabulations of temperatures, precipitation, and the like are in place in any publication which deals with the climatology of any region, but we cannot help wishing that more attention would everywhere be paid to the individual weather types which, when taken together, make up the average condition called Climate. Mere tabulated data are usually lifeless unless a good deal in the way of verbal description of these weather types is included. We cannot help feeling that this side of climatology is destined to receive much more attention in the future. Professor McAdie has, it should be noted, given a good introductory account of the controlling factors in the climatology of California, in which the types of pressure distribution causing wet and dry months in California are set forth and illustrated, as are the movements of Pacific Coast storms. Among other points of interest in the *Bulletin* are chapters on Frost, including methods of protection with illustrations, and on Fog in the vicinity of San Francisco, also illustrated. The latter paper we should have been glad to see extended so as to include a complete discussion of the fogs of the southern California coast, concerning which it is not always easy to secure authoritative information.

R. DeC. W.

XUM

RELATIONSHIP BETWEEN THE EARLY INHABITANTS OF AMERICA AND THOSE OF ASIA.—The *American Museum Journal* (October, 1903) is devoted to a résumé of the history of the organization of the Jesup North Pacific Expedition, and of the field work which it has carried out. The résumé was prepared by Professor Boas, to whom President Jesup intrusted the planning and direction of the whole expedition. The specialists who co-operated in the field work are now engaged in studies of the materials collected. It is estimated that the series of scientific reports resulting from the expedition will fill at least twelve quarto volumes. The *Journal* says that the expedition seems to have established the close relationship between the people of Asia and America. It seems clear that "the isolated tribes of Eastern Siberia and those of the northwest coast of America form one race, similar in type and with many elements of culture in common." The unity of race appears to have been much greater in former times than at present. The former conditions were disturbed by the invasion of eastern tribes in America, such as the Eskimo, Athabascan, and Salish, and of western and southern tribes in Asia, such as the Yakut and Tungus. But enough remains to lead to the conclusion "that the tribes of this whole area must be considered as a single race or at least that their culture is a single culture, which at one time was found in both the northeastern part of the Old World and the northwestern part of the New World."

VOLCANO OF COLIMA.—*The Journal of Geology* (Vol. XI, No. 8) prints a translation of a part of Father Arreola's pamphlet on the eruptions of Colima, Western Mexico, in February and March, 1903, when the volcano was notably active. In his conclusions Father Arreola says the volcano has been active from time immemorial. The intervals between the periods of great activity and the duration of these periods are irregular. It is believed that the volcano has never thrown out lava, evidently because the expulsive force is insufficient to overcome the height—3,960 metres above sea-level. The lava rises to a level lower than this in the crater, but only the hot scoriæ, floating upon its surface, overflow. The ejected matter is fragmentary material—pebbles and sand of various degrees of fineness, which do not appear to have proceeded from the internal reservoir. The heavier products erupted fall upon the higher slopes of the volcano, not more than four or five kilometres from the crater, where they do no harm. The pebbles and sand which rain upon the low and populated dis-

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tricts have caused no damage. There is no sulphur in the emanations, and solfataras have not been discovered. As there is no sign that the eruptive power is augmenting, the inhabitants of the surrounding country may live tranquilly. Loud explosions sometimes occur, but have not produced earthquakes.

GLACIERS OF ECUADOR.—Dr. Hans Meyer, the explorer of Kilimanjaro, spent the summer of 1903 in the study of glacial phenomena among the cordilleras of Ecuador. In a letter to the *Zeitschrift* of the Berlin Geographical Society (1903, No. 7, pp. 527–30), he reports that he investigated the névé and glaciers of Chimborazo, Altar, and Cotopaxi, and the lesser-known summits of Quilindaña and Carihuairazo. He attained an elevation of 20,276 feet on Chimborazo, and reached the crater of Cotopaxi, which he found to be about 1,470 feet deep and 2,625 feet wide. Few vapours escape and no eruption has occurred in a long time. He found that the glaciers differ from those he has studied in Europe and Africa in their structure, stratification, and the size of the grains composing the névé, and also in the appearance and extent of the moraines and their working upon the rocks underlying them. The glaciers resemble those of Equatorial Africa, in the fact that the glaciers of earlier periods extended from 2,300 to 2,600 feet further down the mountain slopes than the present glaciers, as is shown by their moraines.

SAND DUNES AND THEIR CONTROL.—The migration of sand dunes under the influence of wind has given rise to much trouble, and often to considerable economic loss in cases where areas valuable for agriculture or for settlement are encroached upon by the advancing sands. This is one of the many ways in which meteorological phenomena affect man. The control of the movement of these sands is a problem which needs serious attention. In the *National Geographic Magazine* for January, an article by A. S. Hitchcock, on "Controlling Sand Dunes in the United States and Europe" takes up some of the methods of such control. Where vegetation is dormant for a considerable part of the year (as in winter on our Atlantic coast), the winter storms may prevent a covering of vegetation from growing on the dunes; while in regions of dry summers, as along the Columbia River in Oregon, the dunes form during the dry season. The fixation of the dunes by means of vegetation is very largely governed by the climate of the region, which determines the season of migration of the dunes, as well as the kind of plants which shall grow on them. R. DE C. W.

AFRICA.

DISAPPEARANCE OF LAKE SHIRWA.—*Petermanns Mitteilungen* (No. X, 1903) says that the missionaries in British Central Africa report that Lake Shirwa, long represented on the maps as an oval-shaped body of water, about thirty miles long, and ten to fifteen miles wide, to the southeast of Lake Nyassa, has now entirely disappeared. It has been in process of drying up for many years, but the last stages of desiccation were remarkably rapid. Nothing remains of the water surface excepting a few small ponds where the larger brooks flowed into the lake. The chain of islands, among which Mchisi and Tongwe were most prominent, has become a range of hills, and the canoes of the natives are scattered about over the lake bed. The lake was discovered by Livingstone in 1859. It is noteworthy that the first two of the lakes he revealed have now entirely disappeared. He found the placid water surface of Ngami, covering an area of 300 square miles, now a reedy plain, as every vestige of the lake has vanished. In 1883 the natives on one shore of Lake Shirwa refused to ferry Henry Drummond across the lake because their enemies, the Angoni, lived on the other side. The disappearance of these lakes is due to the gradual desiccation which has been in progress for many years over a large area of inner Africa.

TRAINS RUNNING TO KUMASSI.—The railroad from Sekondi, a Gold Coast Colony port on the Gulf of Guinea, was completed on October 1 last, when the first train entered Kumassi, the chief town of Ashanti. The road, 180 miles long, has been building since 1898, the thickness of the bush and the scarcity of labour making progress slow. The enterprise was carried out by the Government of the Gold Coast Colony at a cost of about $8,000,000.

THE SAHARA ENCROACHING UPON THE SUDAN.—Sir Frederick D. Lugard, High Commissioner for Northern Nigeria, in a paper read before the Royal Geographical Society (*Geog. Jour.*, Jan., 1904) says the Sahara is encroaching upon the Hausa States, which border it on the south:

> Much of the distance we traversed between Zaria and Kano and thence to Sokoto and Katsena was over heavy, loose sand where walking is most laborious. Wind-borne sand from the Sahara, which forms the dust-laden atmosphere of the Hamattan,* is constantly being deposited. But probably more important in the process of desiccation is the deforestation of the country. The Asbenawa with their camels are destroying every young acacia and tamarind by hacking them down as fodder, and every great giant tree by lopping off all its limbs till only a dying bole remains. I hope to effect a check on this before it is too late.

* Sir Frederick's spelling of the word *Harmattan.*

BRITISH CENTRAL AFRICA PROTECTORATE.—The Report on the British Central Africa Protectorate for 1902–1903 says that in spite of difficulties the figures for both imports and exports are larger than in the previous year. In the list of exports cotton is mentioned for the first time, and this product seems to promise good results. In the Blantyre district some 300 acres are under cultivation, and the samples sent home have been reported as satisfactory. The cultivation of tea is confined to the slopes of Mlanje Mountain and is still in the experimental stage. The health of the European population continues to improve with the gratifying decline of the death-rate. Arrangements have been made for the construction of a railroad from Chiromo, the British customs port, on the lower Shire River, to Blantyre, to he subsequently extended to Lake Nyassa.

CAUSE OF SLEEPING SICKNESS.—The reports of the Sleeping Sickness Commission (Nos. I–IV, Royal Society, London, 1903) give evidence to show that the dreaded and mysterious illness known as sleeping sickness, which has caused the death of many thousands of persons on the Congo and in Uganda, is a human tsetse-fly disease.

It is caused by the entrance into the blood and cerebro-spinal fluid of a species of trypanosoma, probably *Trypanosoma Gambiense*. The trypanosomes are transmitted from the sick to the healthy by a species of tsetse fly, *Glossina palpalis*, and by it alone. The discovery was made by Dr. Castellani while he was in Uganda studying the disease. He found the parasite in the cerebro-spinal fluid of nearly 70 per cent. of the cases of sleeping sickness examined by him at Entebbe, Uganda, in the early part of 1893. The accuracy of his deductions as to the cause of the disease has since been conclusively shown. It is estimated that 30,000 native inhabitants of Uganda have died of sleeping sickness since its sudden appearance among them two years.

EUROPE.

GEOGRAPHIC RESEARCH.—The Council of the Royal Geographical Society has organized a new section of the Society's work, to be known as the Research Department. A research committee has been appointed, and papers giving the results of researches on the geography of Great Britain and other regions and on geographic methods and problems will be read and discussed at periodical meetings. The Research Committee may recommend to the

Council awards not exceeding $1,000 in any one year for encouragement of geographic research. The applicants recommended for grants shall be either about to undertake work with the approval of the Research Committee or, having submitted an adequate piece of work to that committee, may make application for a grant to defray expenses incurred. The executive Sub-Committee has invited members to submit papers on subjects suitable for discussion, to introduce workers in geography who may be willing to submit papers, and to suggest any line of investigation that seems specially desirable, and the names of persons or institutions competent and likely to undertake the work. In a paper on this new department (*Geog. Jour.*, Jan., 1904), Col. Sir T. H. Holdich expresses the opinion that in this special branch of the work of the Society new impulses can be given to the progress of geographical education and new fields opened for students anxious to make practical use of the theoretical instruction they have received. It is hoped that the Research Committee "may render verdicts in matters relating to the political, commercial, economic, and military phases of geographical inquiry of appreciable value in assisting the counsels of those who administer the government of the empire."

THE SEA OF AZOV.—Recent newspaper reports that the Sea of Azov is drying up are not quite accurate. It is not in process of desiccation, but it is slowly silting up. The mean depth of the sea is only 32 feet. The amount of sediment annually emptied into it, chiefly from the Don River, is about 230,000,000 cubic feet, and, at this rate of progress, the Sea of Azov will be filled up in about 56,000 years. The results of the filling-in process are appreciable from century to century, but still it is slow work. The ruins of the town of Tanais, founded by the Greeks many centuries ago at the mouth of the Don, are now six miles inland.

The newspaper report was due to a phenomenon that recently occurred in the long, narrow arm of the sea known as the Gulf of Taganrog. The waters at Taganrog, the chief wheat port, receded so that for several days the bottom of the gulf was visible for two or three miles. This phenomenon is not unprecedented in these waters. The depth of the gulf is only 10 to 12 feet. Under the influence of strong and persistent winds the level of the water is sometimes raised or lowered from 10 to 15 feet. When the level is lowered the bottom of parts of the gulf is sometimes exposed to view for several days.

POLAR.

THE SCOTTISH ANTARCTIC EXPEDITION. — The *Scotia*, the steamer of the Scottish Antarctic Expedition, arrived at Buenos Aires from the Antarctic on December 15. A brief despatch from Mr. Bruce, commander of the expedition, reports that its scientific work has been very successful up to this time. A hydrographic survey was made over an area covering about 4,000 miles of the little-known Weddell Sea, where the deepest sounding obtained was 2,700 fathoms. Ross reported no bottom at 4,000 fathoms in the neighhourhood of this region. The series of soundings will be an addition to our knowledge of this part of the ocean, and the examination of the organisms obtained at these great depths may yield very interesting results. It is expected that after refitting at Buenos Aires the *Scotia* will return to the South Orkneys and penetrate southern waters again for another summer's work.

ECONOMIC GEOGRAPHY.

OCEAN CABLES IN 1903.—There were in operation, in 1903, 252,436 miles of ocean cables, of which only 38,797 miles, or about 15 per cent., were owned by Governments, the remainder being in the hands of private owners. British capitalists control more than half the total length of the submarine lines, their cables having a length of 154,099 miles, of which 14,963 miles are owned by the Government. The United States is second on the list, with 44,970 miles of cable, nearly all in private hands, the Government controlling only a short mileage in Alaskan waters. France has the third place, with a total length of 24,010 miles, of which 10,092 are the property of the State. The most important of the submarine connections of France are the two lines between Brest and the United States. Danish capitalists place Denmark fourth on the list, with 9,488 miles, chiefly confined to the important cable system in the Orient, which connects Vladivostok with Nagasaki, Shanghai, and Hongkong. Germany is fifth, with 9,228 miles of cable, which will be increased in 1904 by the completion of the second line between the Island of Borkum, at the mouth of the Ems, and New York City. The seventeen other countries which take a financial interest in cables have altogether only 11,131 miles of lines, nearly all of them owned by the various Governments. (*Deutsche Rundschau für Geographie und Statistik*, Oct., 1903.)

FOREIGN SHIPPING IN THE CHINESE TRADE.—The Comité de l'Asie Française has reported on the increased facilities of the lead-

ing commercial nations for their trade with China. Italy will soon have a direct line between Genoa and Shanghai. The Osaka Shosen Kaisha of Japan has put five new steamers on the Yangtse; the Tokyo Kisen Kaisha intends to maintain a bi-monthly service between Hongkong and San Francisco, and also a service between Hongkong, Manila, Java, and Singapore. The tonnage movement of the Chinese ports in 1901 was 48,000,000. Great Britain's share was 51 per cent.; Germany had 16; China, 13; Japan, 11; America, 2; and Russia, 1 per cent. In the previous year Germany's share in the total tonnage was 10 per cent., and the increase in 1901 was due to the rivalry between the Hamburg-American and North German Lloyd, which now maintain four monthly or weekly lines in the coasting trade, and two lines on the Yangtse. The tonnage on the Yangtse increased from 20,000,000, in 1898, to 30,700,000 in 1901. Since 1898 Japan has nearly quadrupled its tonnage in Chinese waters, Germany has tripled its tonnage, and Great Britain, still far in the lead, has not doubled its tonnage. (*Annales de Géog.*, March, 1903.)

Fruit from South Africa.—South Africa is becoming more important every year as a source of supply for the fresh fruit markets of Great Britain. The fruit ripens during the late winter of the northern hemisphere, is placed in cold storage on steamships, and reaches England in the spring months. Exports from Cape Colony in the year ending June 30, 1903, were 21,968 boxes, of which 9,043 boxes were grapes, 7,457 plums, and 3,276 peaches. Plums, as yet, form the most successful branch of the trade, as they arrive in perfect condition. Grapes are especially in demand, but the problem of packing them satisfactorily has not been completely solved, and many arrive in bad condition.

BIBLIOGRAPHIES.

Catalogue and Index of the United States Geological Survey.—Bulletin No. 215 of the United States Geological Survey is a Catalogue and Index of the publications of the Survey from 1901 to 1903. It supplements Bulletin No. 177. These two volumes form a catalogue and index of the Survey's publications from its organization in 1879 to the present time.

New York State Museum.—Bulletin 288 of the University of the State of New York provides a complete index to the publications of the New York State Natural History Survey from 1837

to 1902, inclusive. The volume contains a full list of the publications and authors, a subject index, and an index to the descriptions of fossils.

ANNUAL BIBLIOGRAPHY OF THE ANNALES DE GÉOGRAPHIE.—The twelfth Annual Geographical Bibliography of the Annales de Géographie covers the most important literature of 1902. The number of books and articles included is 977. Notes are appended, as usual, to most of the titles, giving a brief analysis of the contents of each volume, or some of the information it contains. While this annual does not include more than about one-seventh of the geographic titles of each year, most of its selections are among the more important books and papers; and the fact that they are often the latest works on their respective topics increases the usefulness of the collection. The numbers 867–911 relate to the United States, and many of the notes in this section are written by Mr. de Margerie, the French geologist; Dr. Angot, meteorologist; and Mr. B. L. Miller.

BIBLIOGRAPHIES OF CHILE AND BRAZIL.—The latest additions to the lists of books, magazine articles, and maps dealing with the Latin-American countries, which are being prepared by Mr. P. Lee Phillips, are those relating to Chile and Brazil. They are compiled for the International Bureau of the American Republics and are supplementary to the Handbooks issued by the Bureau. The compilations will be of much value for special workers, and even the maps of early date have at least historical interest. The list for Brazil has 145 and that for Chile 110 pages.

NOTES.

La Revue de Géographie opens the year with a new dress and form and a number of excellent photographs. The larger page makes it possible to print many maps without folding. The editors say that the innovations are due to the demand of the public for a more artistic presentation of even the most serious scientific literature.

Th. H. Engelbrecht, member of the Prussian House of Deputies, has published (Paul Parey, Berlin, 1903) "Die geographische Verteilung der Getreidepreise in den Vereinigten Staaten von 1862 bis 1900." The tables, in which appear the average prices of all our leading agricultural staples in every State and Territory for 38 years, certainly cost enormous labour. The advantages of such

compilations for all who have occasion to study the history of prices is evident. The writer points out many of the factors that have influenced these variations in prices. This book is the first of a series on this subject that will cover the leading countries.

Bulletin 70 of the New York State Museum will be welcomed by collectors of minerals. It is a list, prepared by Mr. H. P. Whitlock, of the recorded localities where mineral specimens are found in New York State. The pamphlet will be a desirable guide to collectors, teachers, and students in the field of excursions.

WET YEARS IN ENGLAND AND AUSTRALIA.—H. C. Russell, Government Astronomer of New South Wales, has recently investigated the popular notion (in Australia) that, if abundant rain falls in England, the following year in Australia will also be wet (Journ. and Proc., Royal Soc., N. S. Wales, XXXVI, 1902, 314). The rainfalls of England and of New South Wales, from 1875 to 1901, when plotted together, show very irregular conditions. Although heavy rains in England are sometimes followed by heavy rains in Australia in the following year, this is seldom the case. For example, the years 1894 to 1901 showed an abundance of rain in England, but Australia suffered from a severe drought. The statement that a wet year in England is followed by a wet year in Australia is therefore a fallacy.

R. DEC. W.

DEMTSCHINSKY'S LONG-RANGE FORECASTS.—In 1901 N. Demtschinsky, a Russian engineer, began the publication of a journal under the title, CLIMAT, devoted to the promulgation of his views on long-range forecasts, and containing such forecasts for various parts of Europe. These forecasts are based chiefly on supposed lunar influences, and are illustrated by series of curves of considerable complexity. Some idea of the confidence felt by Demtschinsky may be gained from the fact that a paper published in 1900 bore the title, *Sur la Possibilité de prédire le Temps aussi longtemps d'Avance qu'on le désire.* The views advanced in CLIMAT naturally met with adverse criticism on the part of all scientific men who thought them worthy of any comment whatever, but there has, until lately, been no critical study of Demtschinsky's theory and forecasts. Now, Professor Klossovsky, of the University of Odessa, a well-known meteorologist, has published a thorough *Examen de la Méthode de la Prédiction du Temps de M. N. Demtschinsky* (Odessa, 1903, 8vo, 72 pp.), in which the absurdity of the whole scheme advanced by Demtschinsky is exposed. It is to

be hoped that this paper will be widely read wherever fantastic notions as to the possibility of long-range weather forecasts prevail.

R. DEC. W.

23,399 FEET IN THE HIMALAYAS.—In the *Scottish Geographical Magazine* for January there is a summary of recent mountain climbing in the northwestern Himalayas, completed during the past season by Dr. and Mrs. Bullock Workman. Dr. Workman reached 23,399 feet on a fixed peak of 24,486 feet, "which gives him the world mountaineering record for men, the greatest height before attained being the summit of Aconcagua, 23,083 feet, the highest of the Andes." At a camp at 17,100 feet, the solar radiation thermometer registered 204° Fahr., the air temperature (shade) being 56° Fahr. at the same time. Snowshoes greatly facilitated progress after the thin outer crust of the snow gave way under the powerful sun, but the difficulty of travel was so great that at one time daily camps had to be pitched as early as 10 A.M. At the altitude of 19,355 feet more than half the coolies were prostrated by mountain sickness.

R. DEC. W.

Ergänzungsheft No. 144 of *Petermanns Mitteilungen* is given to "Die antarktischen Eisverhältnisse" by Henryk Arctowski of the *Belgica* expedition. This contribution to the physical geography of the Antarctic is in the form of Arctowski's diary, and is published without change, just as he noted the phenomena from day to day. It is thus, as the author says, only the raw material for a future monograph on the Antarctic ice conditions, which may well be written after the return of the various expeditions. The book is illustrated by numerous sketches of icebergs, the ice and snow conditions of the land, etc.

A station for scientific observers has been erected on the Ofoten railroad at Wassijaure, near the boundary between Sweden and Norway, about 130 miles north of the Arctic Circle. It was built by a professor in the University of Stockholm, and funds to support it are supplied by other private subscriptions. The station will give scientific men an opportunity to investigate polar phenomena under comfortable conditions and at small expense. The first observers to occupy it are the geologist Westergren, the entomologist Haglund, the botanist Roman, and an expert in forestry. Meteorological, magnetic, and other studies fitting the time will be carried on in winter.

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La Nature says that Mr. Dybowski, the Inspector General of Colonial Agriculture, will be sent by the Minister of the Colonies to Senegal and French Guinea to study the conditions in those possessions, with a view, if possible, to sending agricultural colonists into those regions.

THE UGANDA PROTECTORATE AND THE NILE QUEST.

BALTIMORE, Jan'y 20, 1904.

To the Editor of the BULLETIN,
American Geographical Society:

Allow me to submit the following summary of a note presented in my name to the National Congress of French Geographical Societies at Rouen in August, 1903, by Prof Frédéric Lemoine, of the Collége Rollin, Delegate of the Geographical Society of Paris:

In the month of June, 1901, Col. Chaillé-Long called the attention of Gen. Bassot, sub-chief of the General Staff and Director of the Geographical Service of the Army to errors in sheets 28, 36 and 37 of the map of Africa on the scale of 1:2,000,000.

Gen. Bassot, in his reply, promised that the errors indicated should be corrected, as far as possible, in future issues of the sheets in question.

The sheet 36 will show, therefore, the line of Col. Chaillé-Long's itinerary in the country of the Makraka, completed in its western part as far as Gebel Lingeterre, as laid down by him; and also the section Rubaga-Lake Ibrahim of the explorer's route from Gondokoro to Rubaga.

As to the name of Lake Ibrahim, which was discovered by Col. Chaillé-Long in 1874 (and named Ibrahim by the Khédive Ismaïl), Gen. Bassot considers that the name should be maintained (to the exclusion of Choga or Kodja) and it will accordingly appear in future editions of sheet No. 36.

These rectifications by the Geographical Service of the French Army deserve the attention of conscientious cartographers.

In a letter addressed to the Secretary General of the Paris Geographical Society, on the 24th of May, 1903, Col. Chaillé-Long protests against the expressions used by Sir Harry Johnston in a recent work: *The Uganda Protectorate.* Sir Harry writes that when Gen. Gordon succeeded Sir Samuel Baker at Khartum (in 1874) he sent *two or more of his cosmopolitan white assistants—Belgians and Americans—to spy out the land in Uganda.*

To set in their true light the facts here wilfully misrepresented by Sir Harry Johnston, Col. Chaillé-Long makes the following statement as to the two messengers of Gordon.

The first, Chaillé-Long himself, was an officer of the Egyptian Army and Chief of Staff of General Gordon, then Governor-General of the Equatorial Provinces of

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Egypt. He was charged in 1874 by the Khédive Ismaïl with a diplomatic mission to conclude a treaty with M'tesa, King of Uganda.

This treaty, dated July 19, 1874, was officially announced by the Egyptian Ministry to all the Powers, England included. It proclaimed the annexation of Uganda to Egypt, and its execution was realized without delay by sending, as Egyptian Minister Resident at the court of M'tesa, the other *cosmopolitan and spy* (to use Sir Harry Johnston's language), M. Ernest Linant de Bellefonds, son of the celebrated French engineer.

He had resided for several months at M'tesa's capital, Rubaga, when the English expedition under Stanley arrived there (April 15, 1875).

Col. Chaillé-Long affirms that the presence of Linant de Bellefonds at Rubaga thwarted the designs of Stanley, and he produces evidence to show that Uganda is an Egyptian Province and cannot be regarded as an English protectorate, except in contempt of all diplomatic usages.

Col. Chaillé-Long protests in the name of Gen. Gordon, in that of Linant de Bellefonds and in his own, against the malice and perversity of Sir Harry Johnston's narrative.

Without taking part in the debate, the author of this note believes that all friends of geographical and historical truth will regret the insinuations made in *The Uganda Protectorate*, and will esteem it an honour to do justice to the work of Col. Chaillé-Long.

Thus far M. Lemoine. My attention has since been called to a passage in a later work by Sir Harry Johnston, entitled *The Nile Quest.*

We are told on pp. 238–239 of this book:

Edouard Linant de Bellefonds, the Belgian official in Gordon's employment of whom mention was made in the previous chapter, and who met his death at the hands of the Bari, was avenged by the American C. Chaillé-Long, who inflicted severe chastisement on the Bari and allied tribes at and around Gondokoro. Chaillé-Long was made a colonel by the Egyptian Government. He was despatched by Gordon on a mission to Uganda to spy out the land; but owing to the intervention of Sir John Kirk from Zanzibar, the British Government stayed the ambitious Khedive from attempting to include Uganda in the Egyptian Sudan. Chaillé-Long added a little to our knowledge of the Victoria Nile, and gave a more detailed report of Lake Kioga than had been previously gleaned from the unscientific journey of Piaggia.

There is scarcely a line of truth in the entire statement.

Edouard Linant should be *Ernest* Linant de Bellefonds, Egyptian Minister Resident, son of the distinguished French engineer, whose name is connected with Nile exploration since the time of Mehemet Ali. Chaillé-Long did not avenge Linant's death, which occurred when the former had already quitted the Sudan.

There was no connection between the Uganda mission in 1874 and the expedition to Juba in 1875–76, in which Sir John Kirk interfered; separated, as they were, by an interval of 20 months.

The treaty which annexed Uganda to Egypt was signed July 19, 1874. Lake Ibrahim was discovered in August, 1874.

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If the author of *The Nile Quest* had been in quest of the truth, he could have found in the records of the Royal Geographical Society the following letter:

LONDON, July 1, 1881.

DEAR SIR: I am requested by Sir Rutherford Alcock to inform you that he laid your letter to him of 19th May before the Council of the Society and that they have directed the attention of Mr. Ravenstein (who is engaged in compiling for the Society a large map of Equatorial Africa) to the matter, with a view to due credit being given to you for priority of discovery and naming of Lake Ibrahim on the map alluded to.

The Council at the same time disclaimed any responsibility for maps of Africa published by the firm of W. & A. K. Johnston, for whom the late Mr. Keith Johnston must have drawn the map of which you complain.

Your obdt. servt.,

H. W. BATES,
Ass't. Sec'y.

COL. C. CHAILLÉ-LONG.

A little study in the library of the Royal Geographical Society and an inspection of Bulletin No. 4, 1883, of the *Société Khédiviale de Géographie* would have taught Sir Harry Johnston that Piaggia was sent to Lake Ibrahim by Gen. Gordon in *1876*, almost *two years after the discovery of the lake by Chaillé-Long*.

The treaty made with King M'tesa has not been allowed to stand; none the less, it remains in history as the work that brought Uganda within the pale of civilization.

National conceit and prejudice will have their way with men, but there are some things which a man of honour cannot do and Sir Harry Johnston has done them.

COLONEL CH. CHAILLÉ-LONG,
Corresponding Member American Geographical Society and Geographical Society of Paris, Honorary Member *Société de Géographie, Caire, Rouen*, etc., etc.

BOOK NOTICES.

Historic Highways of America, by Archer Butler Hulbert, with maps and illustrations. Volumes 1 to 7. The Arthur H. Clark Company, Cleveland.

It is an interesting project to set before the reader the meaning of the paths—of beast and savage, of explorer and pioneer—which have borne a large share in early American history, and in many cases have handed down their importance to the present day. Our author has undertaken to do this in a series of sixteen volumes

(about half completed), of which seven form the subject of the present notice.

The author has wrought in a fresh and inviting field with enthusiasm, and he has gathered much material from the sources of our early history. Geographers, historians, and thoughtful readers must appreciate these volumes; yet there remain several things much to be desired, in form and in elaboration of subject-matter.

As to form, the series is too extended and costly for the amount of material. Three or four volumes might well have appeared as parts of one, instead of so ordering paper margins and blank pages as to make a brief discussion go a long way in the make-up. Instead of sixteen volumes, costing about forty dollars, five or six, costing one-third as much, would have sufficed.

It must be said, further, that the treatment is at many points desultory, savouring of the discursive method of the local annalist, and falling short of the compact, unified structure of a work of history. There is much undigested quotation, which reveals the interest of the sources, but breaks too seriously the thread of the narrative without casting compensatory light on the theme. Volume 4 is the most serious offender in this respect. Out of 213 pages, 100 are occupied with half a dozen solid extracts, chiefly from early diaries. Thus Chapter VI presents an interesting tirade of a crusty Englishman viewing the people of this country as a member of the royal army; but this has little to do with Braddock's Road.

Another serious defect is the dearth of maps. Those which appear are mainly the conventional and obscure maps of contemporary times, which should be included, but need to be supplemented by modern maps, upon which the old routes are so sharply superimposed as to guide and enlighten the modern reader. Too often the reader must gather the scattered materials of the volume, and by his own effort reconstruct the route and form those mental pictures of it for which he naturally looks to the author. Thus Volume 6 (Boone's Wilderness Road) contains nowhere so clear a description of the actual route through the Cumberland Gap as is found in the closing chapters of James Lane Allen's *Kentucky Blue Grass Region.*

It is, perhaps, requiring too much to ask an author to be at home in two fields, and no doubt a geographer may lay too much stress on a knowledge of land form, but greater precision in matters geographic would make these volumes more informing. A concrete case is found in Volume 7, page 146, where, in a very interest-

ing account of the old Oneida Carrying Place, the country about Rome is said to be "very level." So it is, as between east and west, which the author had in mind; but the town and the "carry" lie where the bold hills of the south and the north close in on the deep trough which leads to the Hudson. A more serious error appears in Volume 6, page 26, where we have a reference to the *mountains* of western New York and Pennsylvania. The author is plainly referring to the hill ranges due to the deep dissection of the Alleghany Plateau, which are wholly distinct in origin, structure, and arrangement from the real mountains of which he is also speaking in Virginia.

Volume 16 is to close the series with an index. This will be extremely useful, but it will hardly atone for the absence of an index for each special volume.

One or two errors are due to slips, in composition or proofreading. Thus we find, Volume 4, page 18, "Odeida" Lake; also in Volume 7, page 145, Rochester is included in a list of sample "classical" names in the State of New York; and at page 149, same volume, St. Leger is said to have been routed at Herkimer, instead of Oriskany.

Volumes 1 and 2 deal with the mound builders' roads, the paths of the great game animals, and the trails of the Indians, and they show, in a striking manner, that civilized man of the last century can claim little originality in his routes, however he may have distinguished himself by his modes of locomotion. The early Kentuckian is quoted who said that the great roadmakers were "the buffler, the Injin, and the Injineer." The buffalo road near old Lexington is said to have diverted the traffic to itself when the first main street of the town became impassable from bad weather. In certain cases, according to our author, railway tunnels are now found exactly beneath old bison trails. These animals also made use of some of the routes later used as portages.

Of specific Indian routes treated we find (Volume 2) the Old Connecticut Path; the Iroquois trail; the Kittanning Path; Nemacolin's Path; and Virginia Warrior's Path. The list also includes several trails in the Central West.

Washington's Road is the theme of Volume 3; Braddock's Road naturally follows in Volume 4. The closing chapter, "Braddock's Road in History," is one of the best in the book, if not in the seven volumes. The Old Glade Road, or Forbes' Road, is the subject of Volume 5. Chapter VII presents this route, as adopted by the State of Pennsylvania, and standing in lively competition with the

more southerly, or Virginia routes, a strife which brings us down to the Baltimore and Ohio and Pennsylvania trunk lines of to-day. Volume 6 (Boone's Wilderness Road) gives us "The Pilgrims of the West;" "The First Explorers;" "Annals of the Road;" "Kentucky in the Revolution;" and "At the End of Boone's Road." The last has some admirable passages upon the significance of this ancient highway in the growth of the nation.

Volume 7 is devoted to Portage Paths. Like its predecessors, it is variable in quality, now offering discussions and narratives of absorbing interest, but suffering at times from the defects to which attention has already been called. The remaining volumes will receive notice when the series is complete. A. P. B.

The Geography of Commerce. Spencer Trotter. Size, 5 x 7 1/2. Pp. xxiv+410. 1903. New York: Macmillan.

This book, which is the first of Macmillan's Commercial Series to appear, is composed of a series of sketches of the resources and industries of the various countries of the world.

Part I. Introductory.—The introductory part is composed of four chapters: The Relations of Geography and Commerce, Climate and Commerce, The Forest, and The Man Element in Commerce. This portion of the book is not satisfactory from a logical point of view. In it we find physiology defined to include the "physical environment," yet we are told that "the relation between the physiographic and human elements in commerce is only a phase of utilizing the resources of the earth."

The assertion is made that the Geography of Commerce includes Economic Geography. Nevertheless, *commerce* refers to the purchase and sale and transportation of goods, while *economic* refers to all activities of man in any way connected with wealth. The proper title for a book like that under consideration is Economic Geography, for when, in it, we are considering such facts as that the metals usually occur in combination with some non-metallic element, or that the materials used to enrich the soil may be divided into three groups, or that wheat is a winter annual, etc., etc., we are not studying commerce at all, but certain technical conditions of the extractive industries mining and agriculture.

Perhaps the book contains as complete an exposition of the physical basis of industry as could be expected in a text for secondary schools, considering the plan which has been pursued in the arrangement of material and the endeavour to say something about

every country in the world; yet one cannot help wondering why something was not said about the application of physical and chemical principles in industry. Nor do we find any survey of the effects of world-geography upon trade, except what is included in a couple of paragraphs in the last chapter of the book. The effect of land forms is not indicated, although Ritter and Guyot have given us hints which students of economic geography should develop. So much concerning the mineral products is introduced into the book that it seems as if a concise statement of the theory of the formation of ore deposits could advantageously have been made the basis for developing the distribution and peculiarities of the mineral industries. For similar reasons the various laws of crop yield should have been stated and illustrated and the principles governing the equilibrium of plant and animal life in a region.

We are told in the first chapter that the book "aims to describe commercial life as influenced and determined" by "not only the physical environment, but the human element as well." But on the next page the aim is stated to be "to give an eye (*sic!*) picture of world trade from the viewpoint of physical facts and laws." Which is right? As a matter of fact the human or social element is pretty much neglected throughout the book. The influences arising from mass of population, race, age, and sex, composition of the population, education, religion, language, law, customs, political states and unfavourable or favourable history are rarely referred to. To illustrate, in discussing Italy no mention is made of the extravagant use of funds for military and court purposes and the bungling commercial policy by which the friendship of France was alienated and the agricultural industries of the south were prostrated. In the consideration of Germany only two or three sentences can be found which convey any hint of the remarkable energy and intelligence of the German States and the Empire in furthering industry by State railways and canals, technical education, workmen's insurance, tariffs, ship subsidies and general industrial legislation.

We wish to raise the general question whether the books on commercial geography at present appearing in this country are not, all of them, conveying to students a one-sided conception of industry by dwelling unduly upon the physical influences which condition it and the physical processes involved in it. Commercial geography is bidding for patronage as the introductory discipline in the study of industry. We had far better go back to the problem of popularizing economics for the secondary schools and building

up its subject-matter in the section devoted to the production of wealth than, by becoming infatuated with the idea of a new application of geography, to present a one-sided and partial view of economic phenomena.

Part II. The United States.—Part II, consisting of seven chapters, is devoted to the United States. As the physical seat of an economic society the country is discussed from but one point of view, namely, the influence of physiography; and this is presented in the form of a review of the physiographic regions.

Following this are several chapters, devoted to the extractive industries, in which the material is grouped on the principle of a discussion of the commodities of commerce. Under the heading, "Distribution of Vegetable Products in Relation to Temperature," on page 87, a splendid opportunity was presented for the discussion of the life zones of the United States; but it was not availed of, and even the bibliography does not contain reference to Bulletin 10, "Life Zones and Crop Zones of the United States," published by the Biological Survey of the Department of Agriculture, and which contains a map absolutely indispensable to the proper treatment of the subject. At the close of the same chapter there is a paragraph entitled, "Plants that might be cultivated in the United States." Here we should certainly have had a few words regarding the principles of plant introduction and plant breeding or selection. In this section we find the recommendation that indigo might be cultivated again in the United States, and this in spite of the fact that synthetic indigo is rapidly making a conquest of the market. Nothing is said about the vastly more important introduction of macaroni wheats, and of figs in California and of Kurshu rice in Louisiana.

The treatment passes to the subject of internal commerce, which is presented from the point of view of the physical transportation of goods. The merchandizing function connected with this is ignored. At this point the chief themes are the movement of grain, live stock, cotton, coal, iron, and lumber, and there is inevitably some duplication of the material previously presented. In this chapter there are about six pages devoted to manufactures, and this appears to be all the attention given to this important group of industries.

Finally, there are two chapters treating respectively of colonial and foreign American trade.

Part III, Trade of the Western Hemisphere other than United States; Part IV, Trade of the Eastern Hemisphere; Part V, Review

of World Commerce. Almost half of the book is devoted to the third and fourth parts, in which the material is arranged by countries and grand divisions. The treatment partakes of the same tone and character as that for the United States. It is manifestly impossible to get beneath the surface of things in a discussion of the industries of all countries in a space of 200 pages.

A word should be said, in conclusion, on the bibliographies and topical questions inserted after each chapter. They give evidence of much careful work, and increase not a little the value of the book. Perhaps the references to public documents are not particular enough. Yeates is given too much credit, for his name constantly appears under the double stars indicating special preference. In the reviewer's opinion Yeates' books are highly unsystematic and, to a degree, superficial; they are charged with undigested trade statistics and other like data, which for most of the volumes are now out of date. In the bibliographies devoted to the United States, there should, by all means, be reference to that mine of information edited by C. M. Depew under the title "One Hundred Years of American Commerce" (2 vols.); and also to the elegantly written "United States of America" (2 vols.), edited by N. S. Shaler. E. D. J.

NEW MAPS.

STATISTICAL ATLAS OF THE UNITED STATES.—The Statistical Atlas of the United States for the Twelfth Census has been issued by the Census Office. It is a quarto, much more convenient to handle than the folio atlas of the Eleventh Census, and contains 207 plates and hundreds of maps and diagrams, all given to the topics—Population, Vital Statistics, Agriculture, and Manufactures. The maps and diagrams are accompanied by explanatory letterpress. The atlas, prepared under the supervision of Mr. Henry Gannett, has appeared with unusual promptness. It was six years after the completion of the Eleventh Census before the accompanying atlas was published. The colored maps and charts are in the best style of the cartographic art. The work is unique in its completeness and convenience. The admirable economic maps, issued by the German Government, are scattered through its quarterly statistical publication, and are therefore less convenient for reference than the maps brought together under one cover in our atlas. It may be obtained from the "Superintendent of Public Documents, Washington, D. C.," for $4.

GEOGRAPHIC AND POLITICAL CHANGES ON THE MAPS.—Hachette & Co., Paris, have published the thirteenth number of *L'Année Cartographique*, containing three map sheets, with text explanatory of the most important geographical and political changes on the maps in 1900–1902. The Asian sheet shows the routes and discoveries of Dr. Sven Hedin in Central Asia and the first hypsometric map of Indo-China based upon material supplied by the Pavie Mission, the Indo-China Geographic Service and many itineraries. A South Polar map, giving the discoveries of the

British expedition in Victoria Land, is also shown. Nine maps on the African sheet show how important have been the changes made by diplomats and explorers in the maps of that continent. The maps illustrate the long journeys of the French in the Sahara, the productive itineraries of Du Bourg de Bozas in Abyssinian territory, Segonzac in Morocco, the Marchand Mission in the region of the Bahr el Ghazal, and the Lake Chad surveys. The American sheet is devoted to the discoveries of Sverdrup in the Arctic, the Alaskan surveys, the Chile-Argentina boundary, and the volcanic eruptions in the Lesser Antilles.

HUNGARY.—Budapest. Scale, 1: 45,000, or 0.65 statute miles to an inch. Translated from the Hungarian (1901) and published by the Statistical Bureau, Berlin.

Showing the main streets, districts and bridges, and colored to indicate density of population from 100 to 1,035 persons to a hectare.

AFRICA.—Cameroons. Der mittlere Teil von Kamerun. Scale, 1: 1,000,000, or 15.7 statute miles to an inch. Compiled by M. Moisel. *Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten.* Vol. XVI, No. 4, Berlin, 1903.

The included territory lies between the Sanaga River and the eighth parallel of north latitude. The map clearly expresses the topographic features along the routes followed by eight or ten of the Government surveyors, and locates many native towns whose co-ordinates, in some cases, have been determined. This is a good specimen of the new maps that are now contributing material to the improvement of atlas sheets.

TRANSACTIONS OF THE SOCIETY.

JANUARY, 1904.

The Annual Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, January 19, 1904, at 8.30 o'clock P.M.

Vice-President Moore in the chair.

The following persons, recommended by the Council, were elected Fellows:

William Northrup McMillan. Charles R. Saul.

Messrs. Henry Vignaud, of Paris, France, and William H. Hunt, of Tamatave, Madagascar, were elected Corresponding Members.

The Annual Report of the Council was then submitted and read:

NEW YORK, January 14, 1904.

To the American Geographical Society:

The Council respectfully submit the following report for the year 1903:

The number of Fellows on the 1st of January was 1,198. The additions during the year number 150. The losses by death, resignation, etc., were 108, and the total Fellowship on the 31st of December was 1,240, of which number 356 were Life Fellows.

The additions to the Library number 3,851: Periodicals and Pamphlets, 2,891; Books, 594; Maps and Charts, 335, and Atlases, 31.

Six meetings of the Society were held in the year :

On the 27th of January Prof. William Libbey addressed the Society on the Jordan Valley and Petra ;

On the 17th of March Mr. Harry De Windt described the incidents of his journey from Paris to New York by land ;

On the 14th of April Dr. Elmer L. Corthell addressed the Society on Two Years in the Argentine Republic as Consulting Engineer of the Ministry of Public Works;

On the 17th of November Prof. E. L. Stevenson delivered the address on Martin Waldseemüller and the early Lusitano-Germanic Cartography of the New World, interrupted by the snow-storm of February 17th ;

On the 15th of December Dr. Frederick A. Cook described his attempt to make the ascent of Mt. McKinley.

There have been published in the Bulletin, besides the Record and the Scientific Notes and Letters, seventeen original papers, including Commander Peary's Report on Work done in the Arctic in 1898–1902.

For the condition of the Finances reference is respectfully made to the report of the Treasurer, herewith presented.

At the meeting of the Council held on the 10th of December, the Cullum Geographical Medal was unanimously awarded to Dr. Georg von Neumayer of Hamburg, for his services to the cause of geographical science as explorer of Australia and director of the German Naval Observatory for thirty-seven years.

At the request of the authorities of the Eighth International Geographic Congress, which is to assemble in Washington in September, 1904, this Society has undertaken to conduct meetings of that Congress in New York on the 13th, 14th and 15th of September.

All of which is respectfully submitted,

HENRY PARISH,
Chairman.

LEVI HOLBROOK,
Secretary.

The report of the Treasurer was then read:

Report of the Treasurer to the American Geographical Society for the year 1903 :

General Account:

The Treasurer respectfully reports that on January 1st there was on hand a Cash Balance of			$7,126.58
During the year there have been received for Fellowship Dues, Sales of Publications and Interest on Investments			20,791.26
Legacies			3,256.60
			$31,174.44
There have been expended for Salaries, Meetings, Library, Publications, House Expenses, Insurance, Postages, Furniture, etc	$18,259.86		
Contribution in aid of Mr. Nichols's expedition to Tibet	500.00		
Invested	$68,850.90		
Less received for mortgages matured and paid off	56,500.00	12,350.00	31,109.86
Leaving a balance for the General Fund			$64.58

All of which is respectfully submitted.

W. R. T. JONES,
Treasurer.

January 14, 1901.

The Committee charged with the duty of selecting candidates for the offices to be filled made the following report:

NEW YORK, January 14, 1904.

To the Council of the American Geographical Society:

The Committee appointed to recommend to the Society suitable persons to be elected in January, 1904, to fill vacancies then existing in its offices, respectfully report that they would recommend the election of the following named persons to the offices below designated:

President—ROBERT E. PEARY
(Term to expire in January, 1905).
Vice-President—D. O. MILLS
(Term to expire in January, 1907).
Treasurer—WALTER R. T. JONES
(Term to expire in January, 1905).
Recording Secretary—ANTON A. RAVEN
(Term to expire in January, 1907).
Councillors—LEVI HOLBROOK,
MORRIS K. JESUP,
GUSTAV E. KISSEL,
HENRY PARISH,
JOHN A. HADDEN,
(Terms to expire in January, 1907.)

Respectfully submitted,
HENRY HOLT,
W. H. H. MOORE,
FRANCIS M. BACON,
} *Committee.*

On motion, duly seconded, Mr. C. C. Adams was authorised to cast the vote of the Society for the candidates and they were declared duly elected.

Mr. Robert Lansing then addressed the Society on "The Questions Settled by the Award of the Alaskan Boundary Tribunal."

On motion, the Society adjourned.

NOTES AND NEWS.

THE NEXT MEETING of the Society will be held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, February 23, 1904, at 8.30 o'clock P.M.

The Rev. Putnam Cady will address the Society on the Physical and Historical Geography of the Dead Sea Region.

THE Index, Title-page and Contents of the BULLETIN for the year 1903 are distributed with the present number.

IT HAS BEEN DECIDED to make the BULLETIN a monthly publication of 64 pages, beginning with January of this year. The numbers for February, March, and April, now in hand, will be issued in quick succession, and it is expected that the publication will become regular in the early summer.

THE U. S. Board on Geographic Names approved the following decisions January 6, 1904:

Allegrippis; ridge in Huntingdon Co., Pa. (Not Allegrippes nor Allegripus.)

Beckley; pond in town of Norfolk, Litchfield Co., Conn. (Not Blakley nor Blakeley.)

Brannock; bay, Dorchester Co., Md. (Not Bronnack, Brannack, nor Brannocks.)

Bumkin; island, Hingham Bay, town of Hull, Plymouth Co., Mass. (Not Pumpkin.)

Celoron; P. O. and R. R. station, Chautauqua Co., N. Y. (Not Celeron.)

Cienega del Gabilan; land grant, San Benito Co., Cal. (Not Sienega del Gabilan.)

Dorseys; creek on north side of Annapolis, Anne Arundel Co., Md. (Not Graveyard, Dorsey, nor College.)

Highland; lake in town of Winchester, Litchfield Co., Conn. (Not Long.)

Inchwagh; lake in Livingston Co., Mich. (Not Nitchwage nor Michuaga.)

Lemon Fair; river, Addison Co., Vt. (Not Lemonfair nor Lemonfare.)

Morgan River; stream in Barkhampsted, Litchfield Co., Conn. (Not Mohawk Brook.)

Rocky Mount; P. O., town, and township in Edgecombe Co., and town and township in Nash Co., N. C. (Not Rockymount.)

Rosbys Rock; P. O. and R.R. station, Marshall Co., W. Va. (Not Rosbysrock nor Rosbbys Rock.)

Sollers; R.R. station, and point in Patapsco River, Baltimore Co., Md. (Not Sollars nor Soller.)

Spa; creek on south side of Annapolis, Anne Arundel Co., Md. (Not Spaw nor Spat.)

Starvout; P. O., settlement, and creek, Douglas Co., Oregon. (Not Starveout nor Starve Out.)

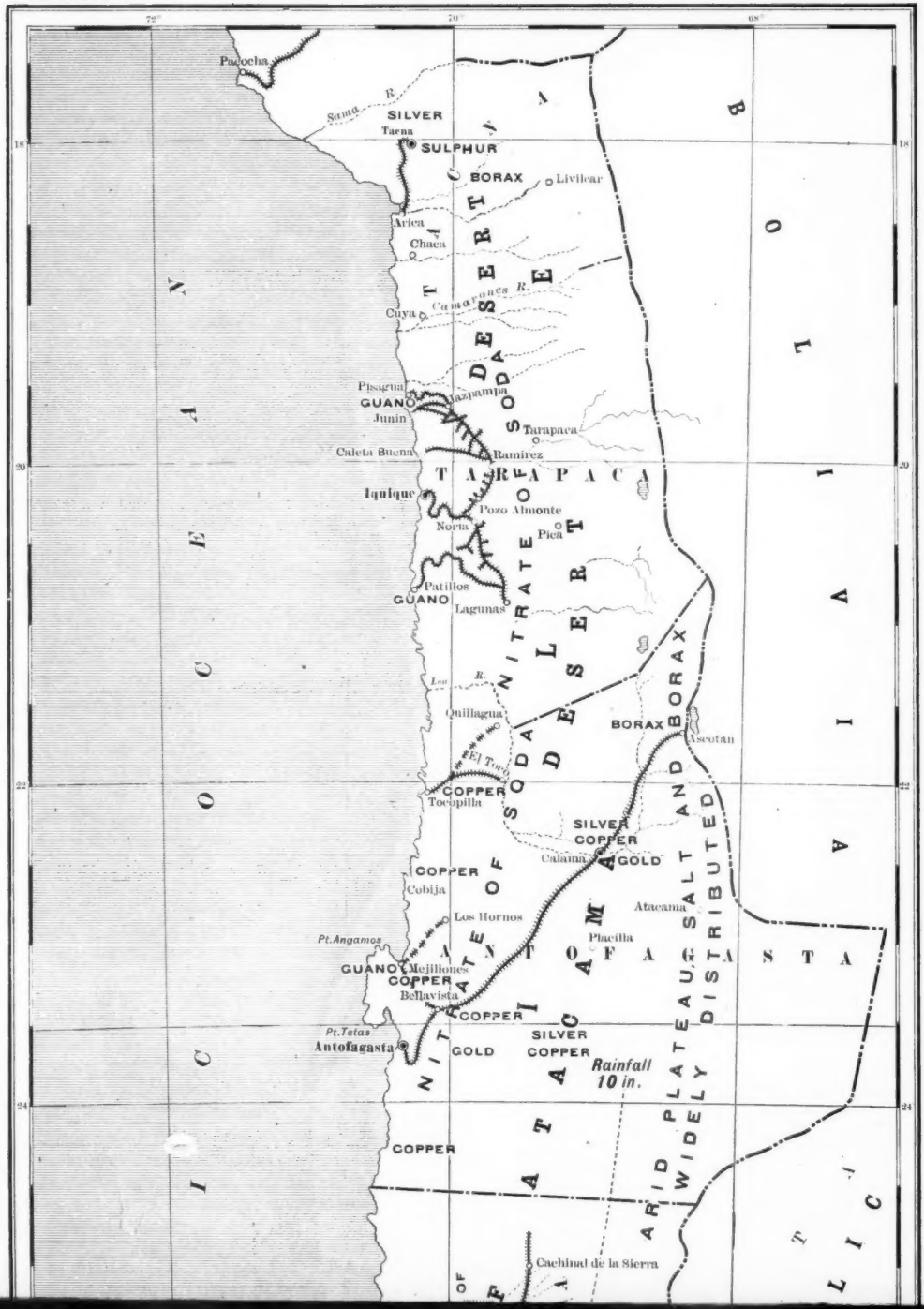
It is to be regretted that the Board lends its authority to the form, *Cienega del Gabilan*. The words *cienega* and *gabilan* are incorrect forms of the Spanish words *ciénaga* and *gavilan*. Not impossibly, the pronunciation common in California may have affected the decision; but common pronunciation, even in one's own language, is rarely a safe guide. Millions of Englishmen speak of *'Am'stead 'Eath*, but those who know write and pronounce *Hampstead Heath*.

A COMMUNICATION from the Dresden Verein für Erdkunde announces the death in that city, on the 23d of December, of Dr. Sophus Ruge, the eminent geographer, for thirty years President of the *Verein*.

WE REGRET to record the death, on the 16th of January, of Dr. Leopold Wilhelmi, President of the Kaiserliches Statistisches Amt, Berlin.

XUM

SECTION 1



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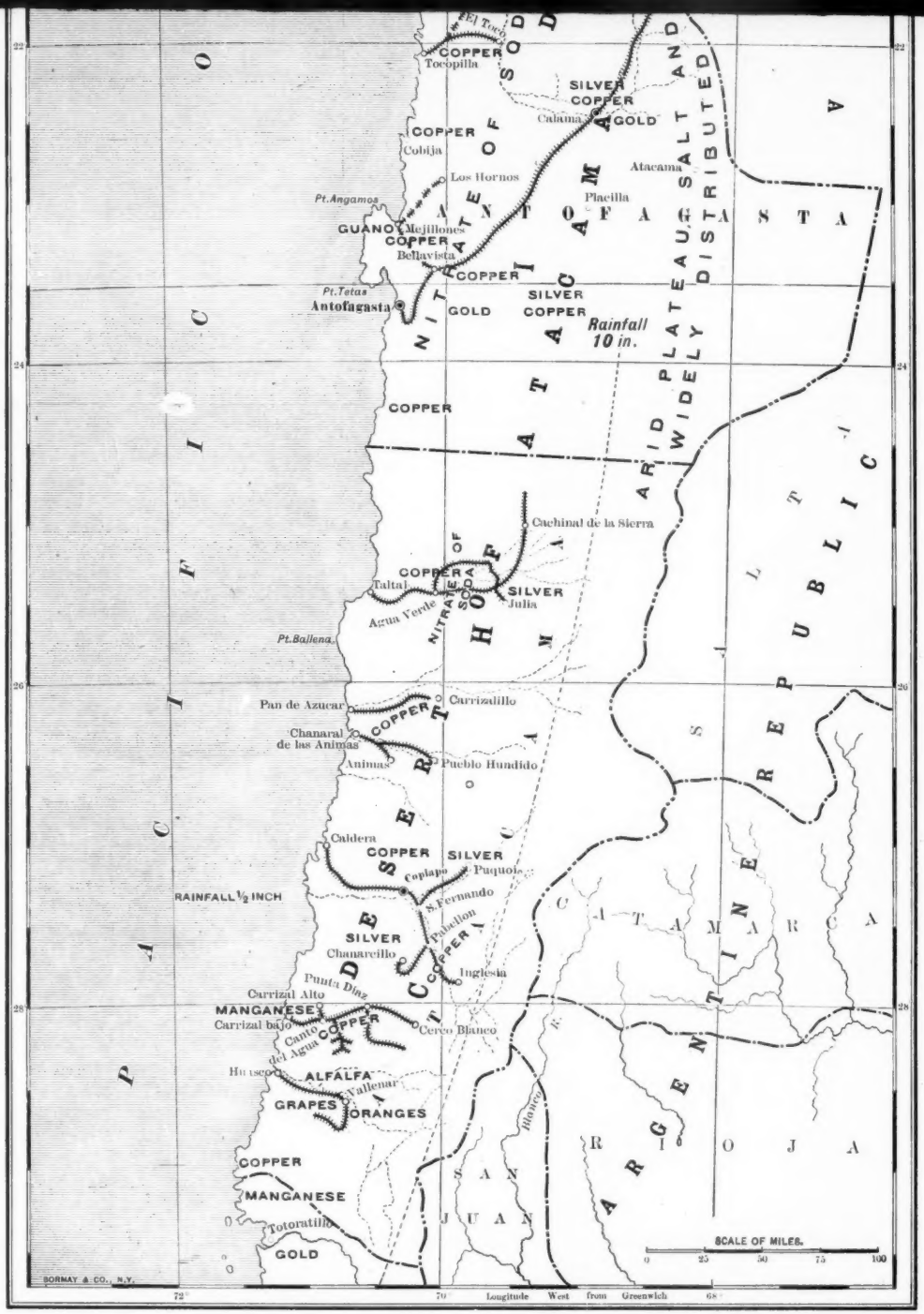
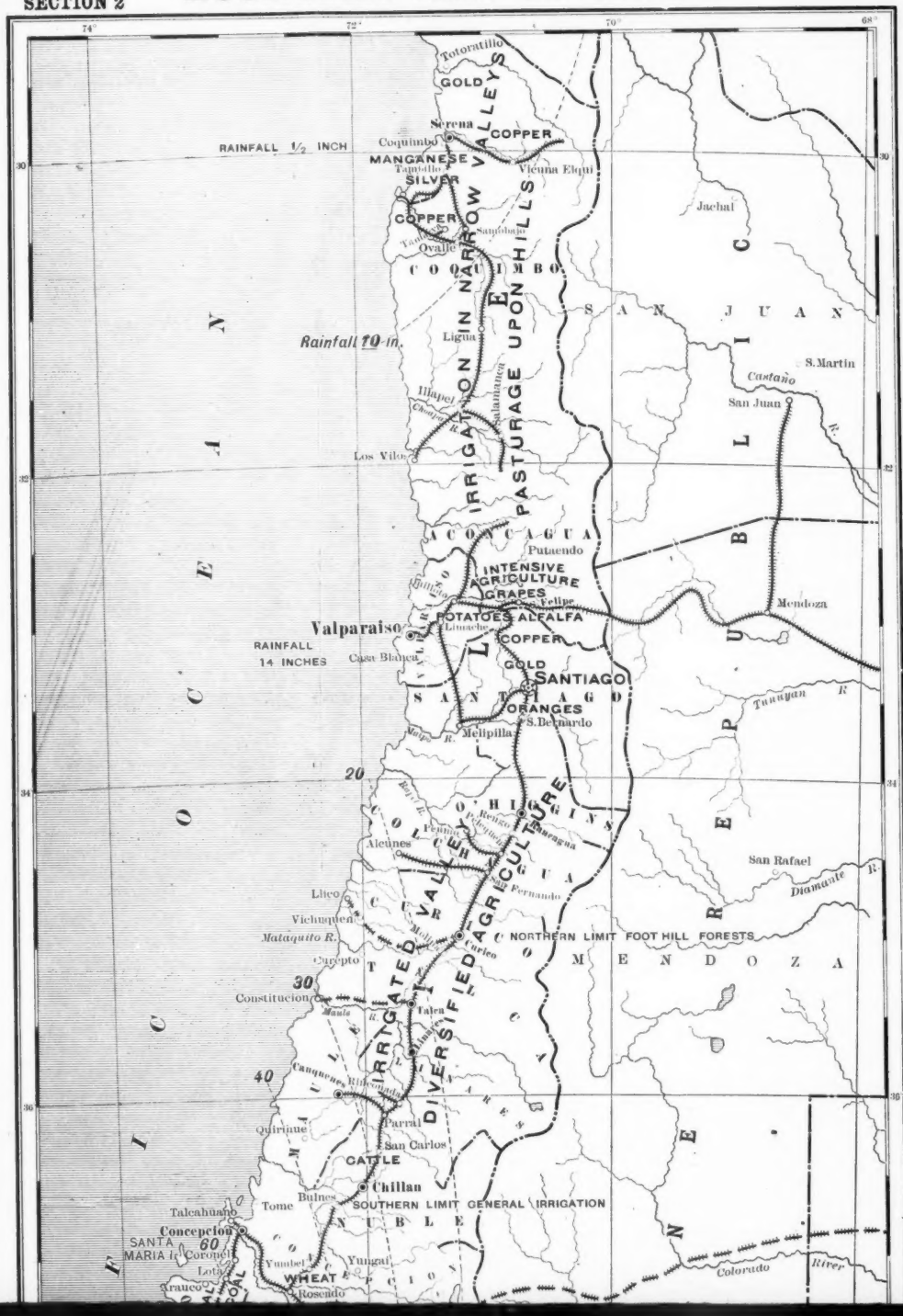

PACIFIC OCEAN
ATACAMA DESERT
NITRATE OF SODA
ARGENTINE REPUBLIC
CHILE
ATACAMA
ANTOFAGASTA
COPPER
Tocopilla
SILVER
COPPER
Calama
GOLD
Cobija
Los Hornos
Atacama
Pt.Angamos
Placilla
GUANO
Mejillones
COPPER
Bellavista
Pt.Tetas
Antofagasta
GOLD
SILVER
COPPER
Rainfall 10 in.
ARID PLATEAU WIDELY DISTRIBUTED SALT AND
COPPER
Cachinal de la Sierra
COPPER
Taltal
SILVER
Julia
Agua Verde
Pt.Ballena
Pan de Azucar
Carrizalillo
COPPER
Chanaral de las Animas
Animas
Pueblo Hundido
Caldera
COPPER
SILVER
Coplapo
Puquios
RAINFALL ½ INCH
S.Fernando
Paballon
SILVER
Chanarcillo
COPPER
Inglesia
Punta Diaz
Carrizal Alto
MANGANESE
Carrizal bajo
Canto del Agua
COPPER
Cerco Blanco
Huasco
ALFALFA
Vallenar
GRAPES
ORANGES
COPPER
MANGANESE
Totoralillo
GOLD
SAN JUAN
Jaurez
CATAMARCA
RIOJA
SCALE OF MILES.
0 25 50 75 100
BORMAY & CO., N.Y.
72° 70° Longitude West from Greenwich 68°
22 24 26 28

XUM

SECTION 2

ECONOMIC MAP OF CHILE



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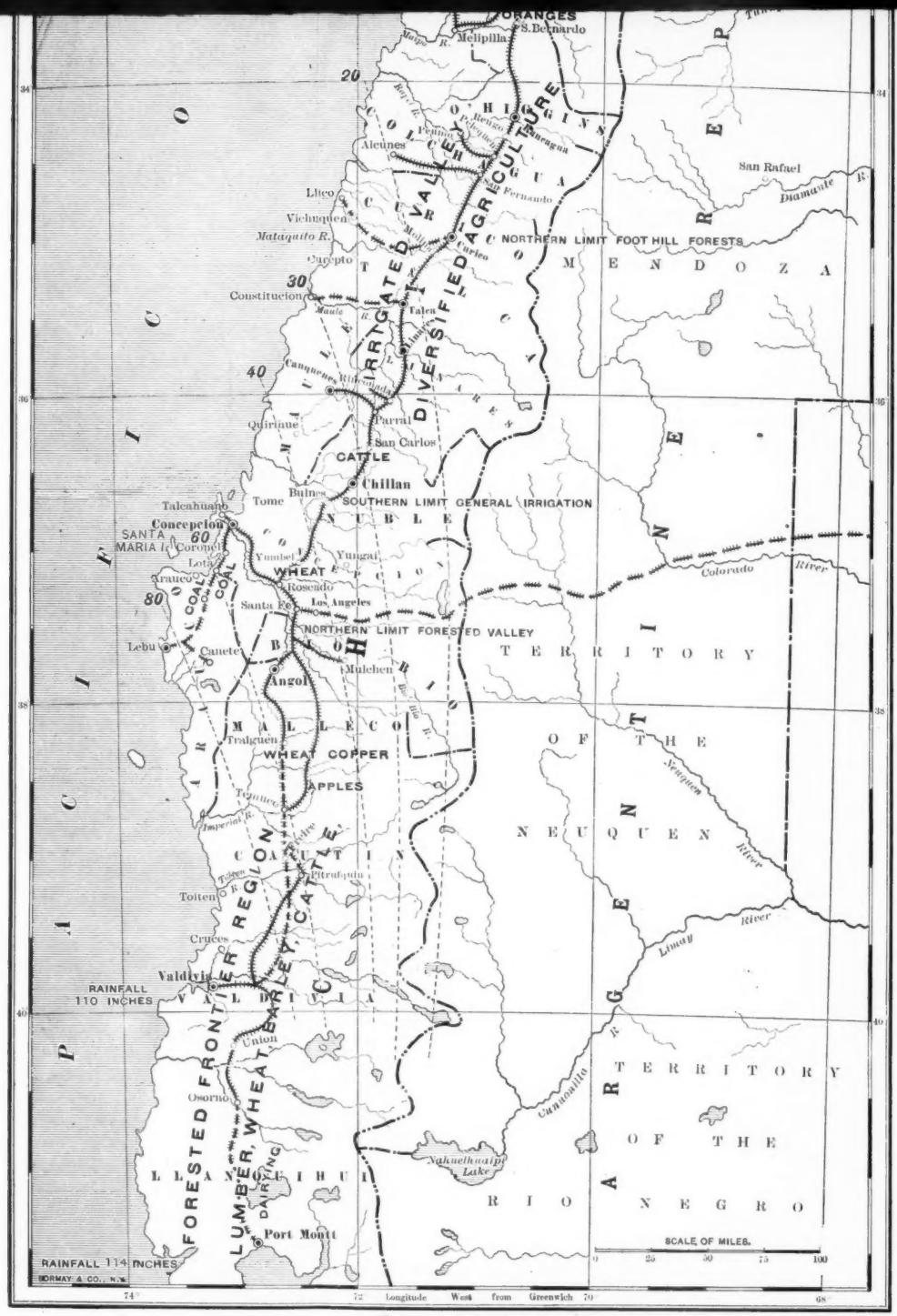

Bulletin of the American Geographical Society, February, 1904.

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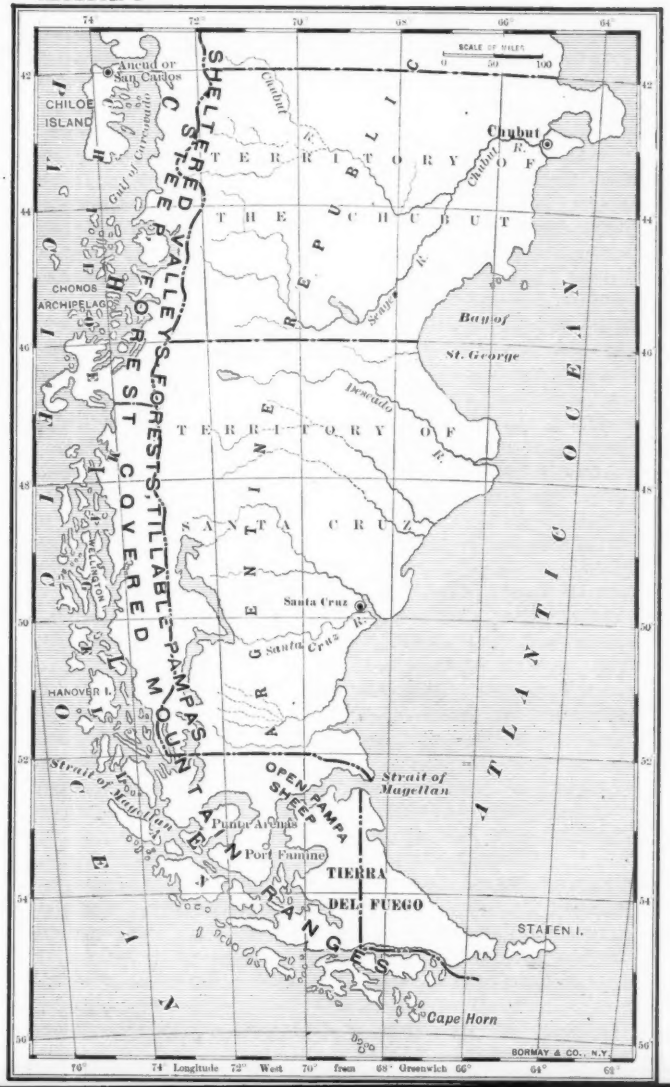
SECTION 3



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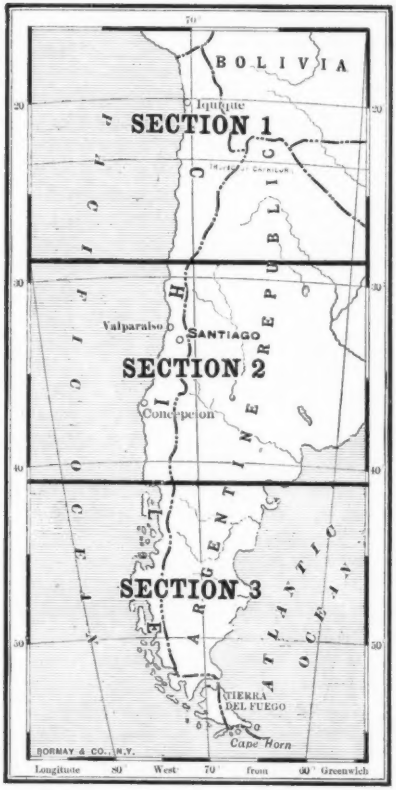
BOLIVIA
Iquique
SECTION 1
PACIFIC OCEAN
CHILE
ARGENTINE REPUBLIC
Valparaiso
SANTIAGO
SECTION 2
Concepcion
SECTION 3
ATLANTIC OCEAN
TIERRA DEL FUEGO
Cape Horn
BORMAY & CO., N.Y.
Longitude 80 West 70 from 60 Greenwich

XUM